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Number 1.

JULY, 1899.

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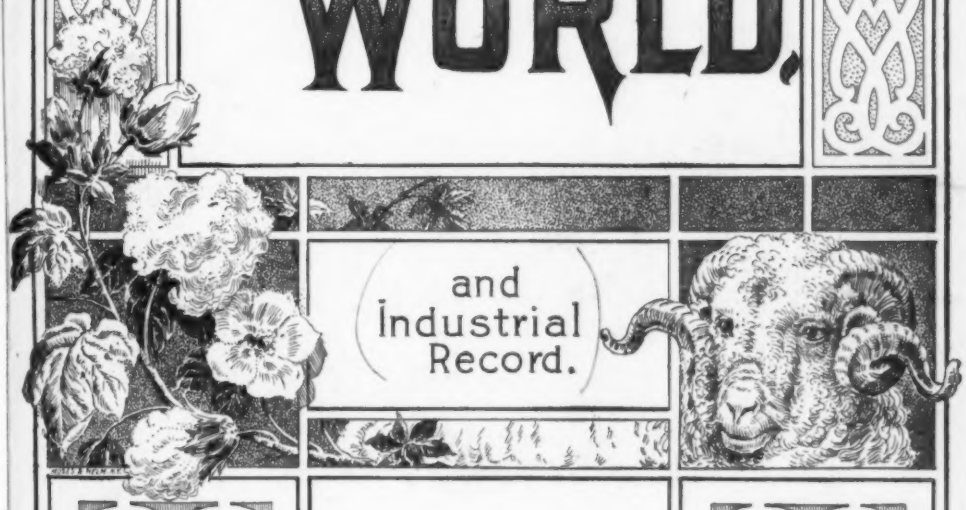
TEXTILE WORLD,

and Industrial Record.



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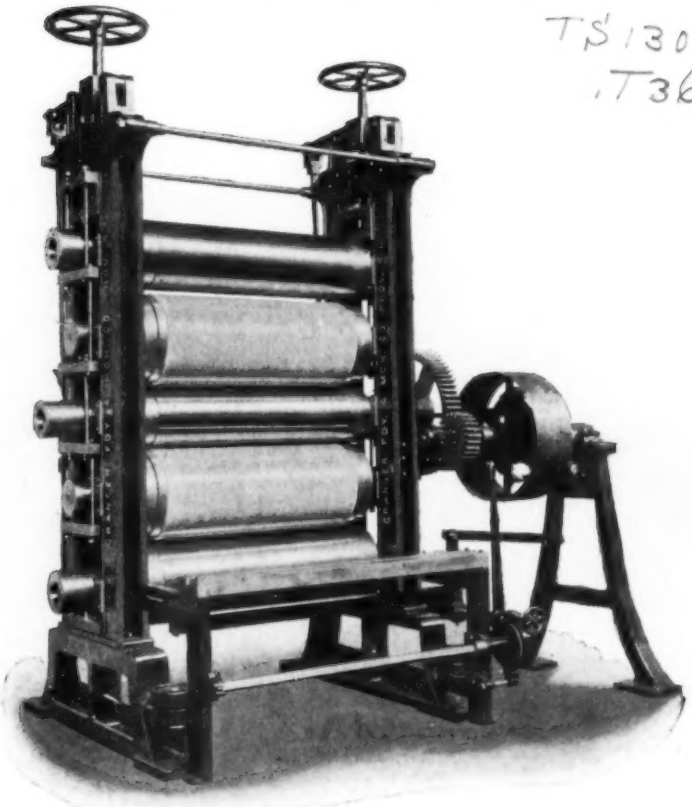

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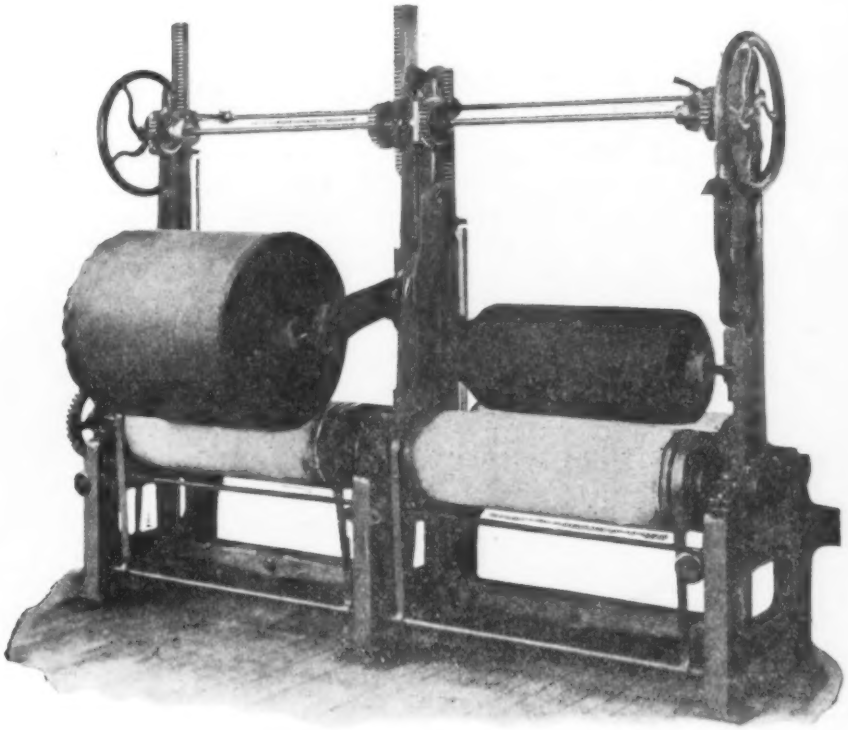

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W. P. SIMPSON, Patentee.

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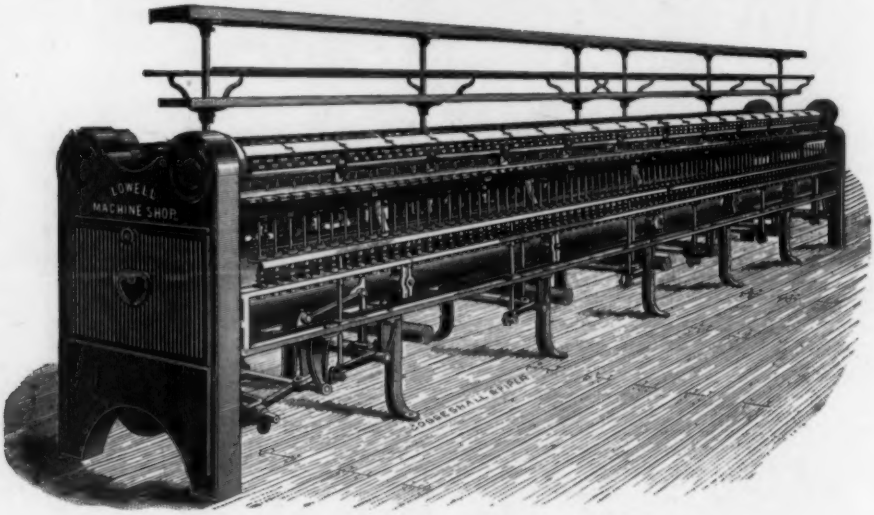

Revolving Flat Cards,
Railway Heads,
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Roving Frames,
Ring Spinning Frames,
Twisters, Spoolers,
Warpers, Slashers,
Looms.

WORSTED MACHINERY.

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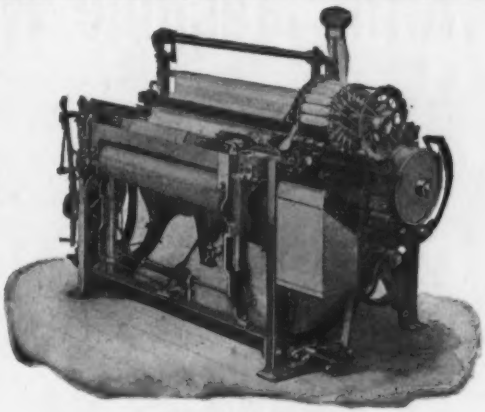

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MANY cotton mill managers will, therefore, conclude that they can possibly have a chance to run their old machinery at a profit instead of facing a daily loss.

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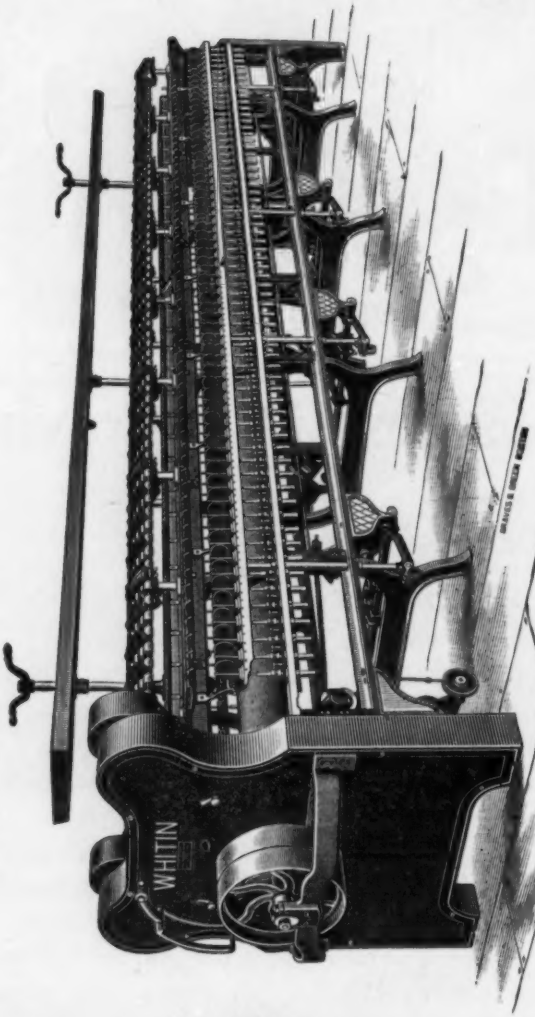

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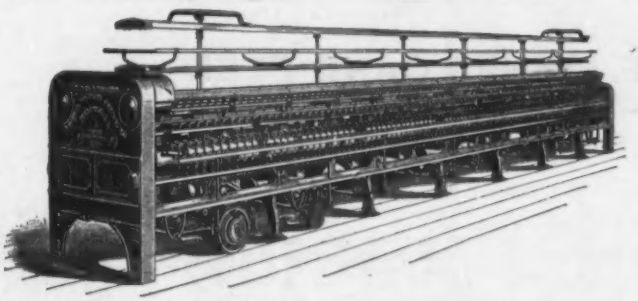

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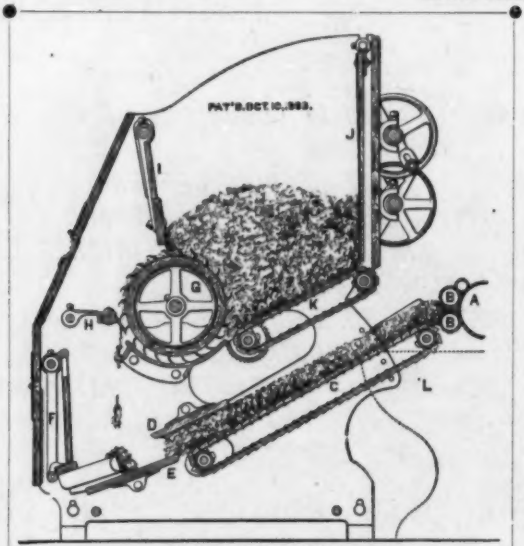

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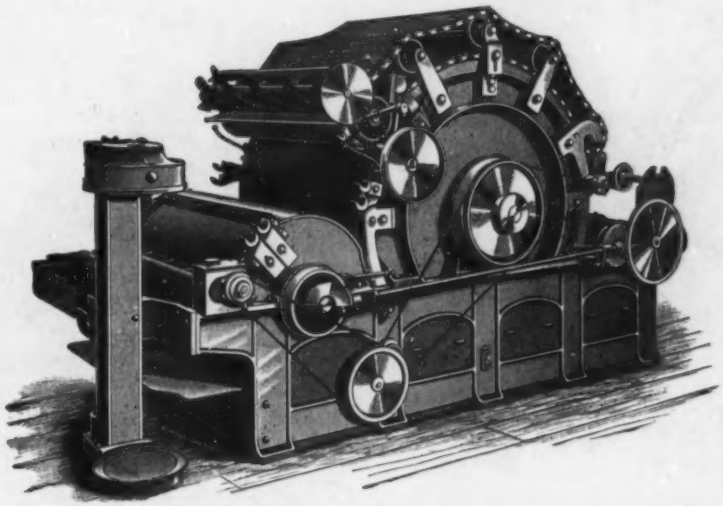

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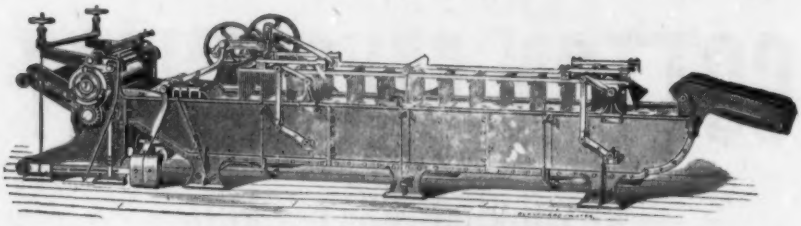

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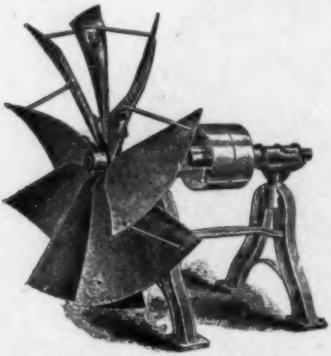

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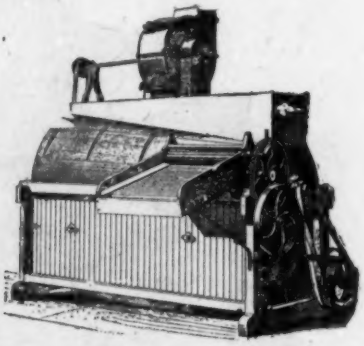
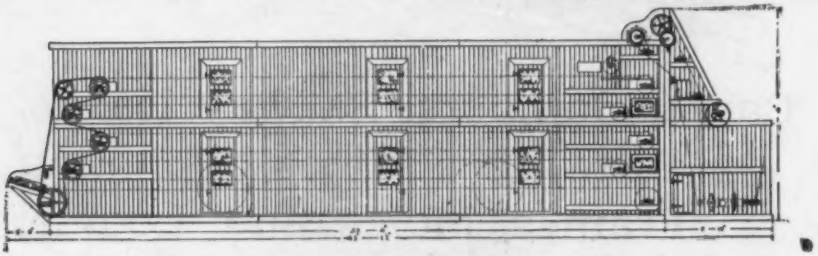


IMPROVED CONE DUSTER.
Exterior View Right-Hand Machine with Fan.



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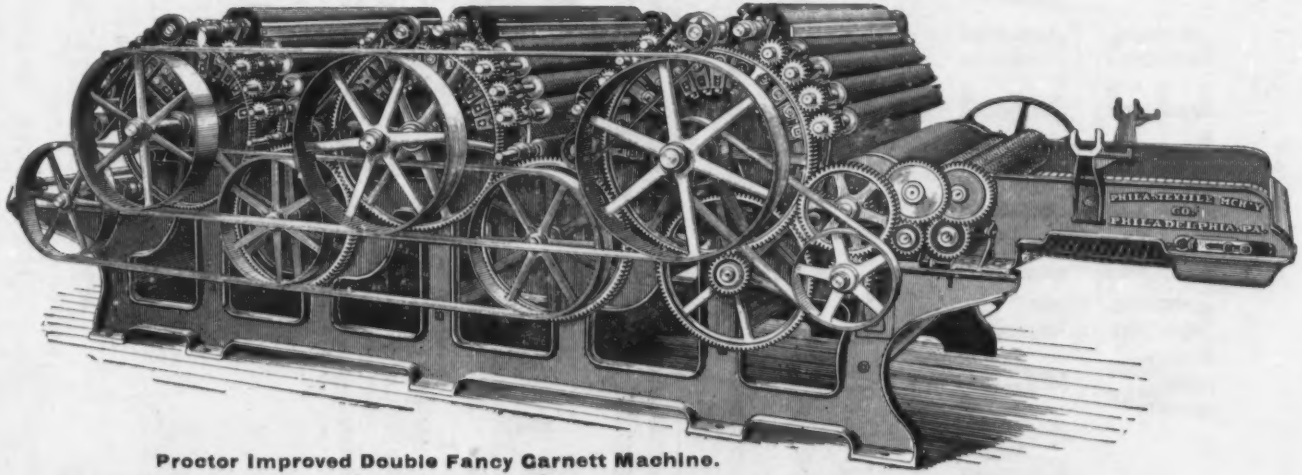

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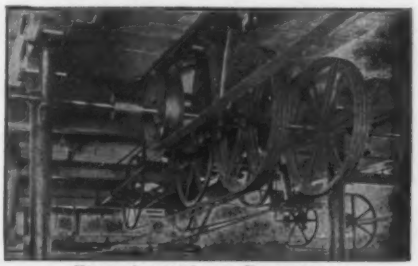

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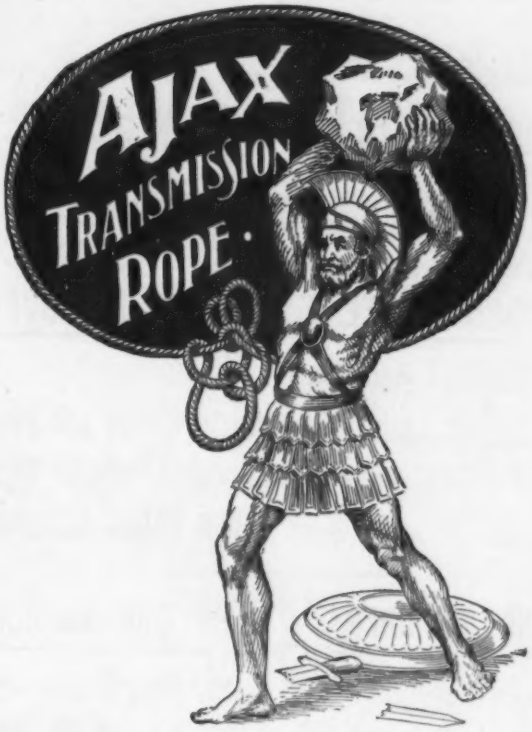

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Special quarterly issues are published in January, April, July and October; one (January) being a statistical issue, and the others devoted especially to the cotton, knitting and woolen branches, respectively.

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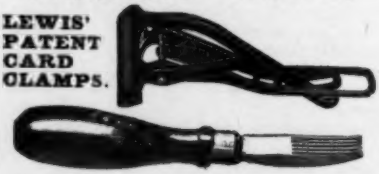

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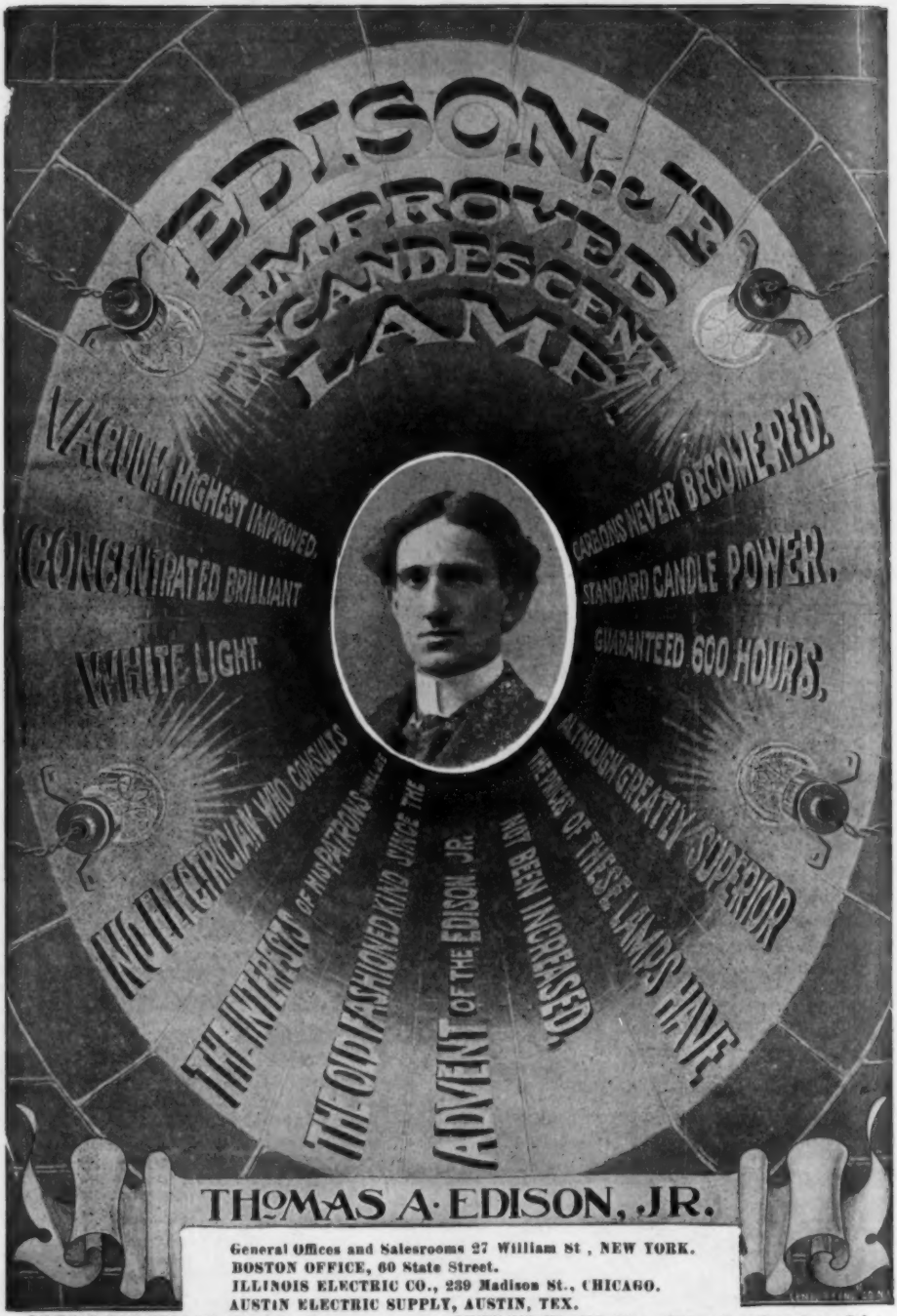

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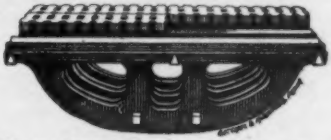

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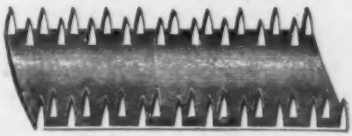

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George W. Gregory, in November, 1874, resigned his position as Principal Examiner U Patent Office to enter the firm.

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Mr. George W. Gregory, of Crosby and Gregory, has taken out for us since January, 1875, more than two hundred patents. GEO. DRAPER & SONS.

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Experts in all matters connected with the manufacture of Textile Fabrics, Sewing Machines, and Electricity

List of Textile Patents.

Issued May 30, and June 6, 13 and 20, 1899.

Bobbin-Holder and Thread-Catcher for Spindles. 627,249. Oliver C. Muir, No. Adams, Mass.

Card-Punching Machine, Jacquard. 627,256. Joseph A. Groebli, New York City, assignors to the Kursheedt Manufacturing Company, same place.

Cloth-Shearing Machine. 627,342. Maxim La Fountain, Jr., Woonsocket, R. I., assignor to the Woonsocket Napping Machinery Company, same place.

Cloth-Winding Bolt-Frame, Skeleton. 625,937. John C. Murphy, New York City, assignor to the Boston Loan Company, Boston, Mass.

Combing-Machine for Textile Materials. 625,967. Eugene Delette, Lure, France.

Cotton-Chopper and Cultivator, Combined. 626,818. Robert L. Parker, Merkel, Tex., assignor of one half to C W. Harres, same place.

Embroidering and Edging Machine. 626,671. Emile Cornely and Robert Cornely, Paris, France.

Heddle-Making Machine. 626,900. Wm. H, Gibbs Clinton, Mass., assignor to the Gibbs Loom, Harness & Reed Co., same place.

Heddle-Making Machine. 626,571 Franklin B. Shuster, New Haven, Conn., assignor to the J. H. Williams Co., Utica, N Y.

Jacquard Machines, Bottom-Board for. 626,941. George W. Stafford, Providence, R. I., assignor to the Crompton & Knowles Loom Works, same place.

Knitting Machine. 627,083. Andrew Weimar, Philadelphia, Pa., assignor of one-half to the Krout & Fite Manufacturing Co., same place and Camden, N. J.

Knitting Machine. 625,856. George F. Sturgess, Leicester, England.

Knitting-Machine Needle. 626 114. John Vernon, Philadelphia, Pa., assignor to the Franklin Needle Company, Franklin, N. H.

Loom. 626,499. Alfred Morell, Millbury, Mass., assignor to the Crompton & Knowles Loom Works, Worcester, Mass

Loom. 626,314. Friedrich Wever & Carl Seel, Barmen, Germany,

Loom, Box. 626,510 Henry Talks, Paterson, N. J., assignor of one-half to William Melvin, same place.

Loom. 626,898. Alfred Gartner, Paterson, N. J., assignor to Benjamin Eastwood, same place.

Loom. 626,834. Henry I. Harriman, New York City, assignor to the Universal Loom Co., Readville, Mass.

Loom. 626,187. James H. Northrop, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Me.

Loom. 626,188. James H. Northrop, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Me.

Loom for Weaving Chenille Fabrics. 625,841. Harry Hardwick, Philadelphia, Pa.

Loom for Weaving Chenille Fabrics. 625,928. Harry Hardwick, Philadelphia, Pa.

Loom for Weaving. 627,440. Giuseppe Patrone, Turin, Italy.

Loom-Shuttle. 627,423. Theodor Huster, Paterson, N. J., assignor of one-half to Frederick W. Helms, same place.

Loom-Shuttles, Tension Device for. 627,263. Chas. H. Heindel, Glen Rock, Pa.

Looms, Filling-End Holder for Automatic. 626,201. George O. Draper, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Me.

Looms, Let-off and Take-up Motions for. 626,161. Austin J. Hanks, Wilmington, Ohio.

Looms, Shuttle-Box Motion for. 626,960. Henry Pardsley, Providence, R. I.

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Looms, Stopping, Correcting and Restarting Mechanism for. 626,860. Abram D. Emery, Taunton, Mass., assignor to the Universal Loom Co., New York City.

Looms, Warp-Controlling Means for. 627,445. John A. Robinson, Adams, Mass., assignor to the Mason Machine Works, Taunton, Mass.

Looms, Warp Stop-Motion for. 625,896. John Poyser, Wirksworth, England.

Looms, Warp Stop-Motion Detector for 626,412. George O. Draper, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Me.

Mule, Self-Acting. 626,094. Joe Ramsden, Arthur T. Taylor, and James Ramsden, Birstall, England.

Spindle. 627,062. Henry E. Hughes, Pawtucket, R. I.

Spinning-Jenny. 625,811. Wm. H. H. Sisum, Belleville, N. J., Jos. Wilkinson administrator of said Sisum, deceased.

Spinning, Machine for and Process of. 626,195. Ding Cie Sui, Foo Chow, China, assignor to George S. Miner and William N. Brewster, same place.

Weaving, Apparatus for. 623,149. Leon Desmarais and Louis Canal, Paris, France.

Woven Fabric and the Art of producing same. 626,878. Eugene Tymeson and Reuben Borland, Yonkers, N. Y., assignors to the Alexander Smith and & Sons Carpet Company, same place.

Yarn, etc., Spooled. 626,879. Eugene Tymeson and Reuben Borland, Yonkers, N. Y., assignors to the Alexander Smith & Sons Carpet Company, same place.

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ADDRESS:

Calmore & Co., Patent Attorneys, 501 Chestnut St., Phila., Pa.

QUENTIN McADAM.

TEXTILE WORLD.

Vol. XVII. JULY, 1899. No. 1.

QUENTIN McADAM.

In this issue, we present a picture and sketch of the business career of Quentin McAdam, the well-known merchant and knit goods manufacturer of Utica, N. Y., for years a successful jobber of dry goods in his adopted city, before entering the larger field of a manufacturer. Doubtless this fact has contributed not a little to his prominence in his present occupation. Of Scotch parentage on his father's side, and revolutionary on his mother's, he was born in the valley of the Oriskany, at the little village of Deansboro, Oneida County, N. Y., on October 28th, 1851. When but three years of age his father died, leaving a widow and five children in narrow circumstances, of which Quentin was the fourth. His only inheritance was a rugged constitution, and at the earliest possible moment it became necessary for him to begin to help his mother in her efforts to support the family. He commenced work on a farm by the month, when but twelve years of age, going to school winters. This early service helped to develop him physically and gave him his well known characteristic of self reliance.

At fifteen he became a clerk in a country store, where he had to work for from 15 to 16 hours a day, at one hundred dollars per year and board. At the end of the first year he thought he had $25.00 coming to him, only to be informed by his employer, who knew he was going to make a change of location, that their accounts "just balanced."

He immediately took employment in the wholesale establishment of Buckingham & Mitchell, Utica, N. Y. He began his service here, in the basement, as a "packer." In two years he was stockkeeper and salesman and at nineteen became a commercial traveler for the house in the territory of northern New York, going as far as the St. Lawrence river. He continued in this capacity for nine years, Mr. Mitchell, the junior member of the firm having in the meantime retired as a partner. During all this time he saved of his money a goodly sum each year, not neglecting to aid his mother. He became the most useful employee in the establishment, working and traveling early and late and always with the purpose of one day becoming a proprietor.

He sought to overcome his early deficiences in education by observation and judicious purchases of books and reading matter. He studied intimately the careers of great merchants and business men, delved deeply into the secrets of the law of accumulation and pecuniary independence, and early learned to spend less than he earned. In ten years on comparatively small salaries, he had saved nearly five thousand dollars. Then came a crisis in his career.

Owing to large losses in another business his employer failed. McAdam bought the business of the assignee. By his excellent personal character, with the money he had in bank and what money several partners of smaller interests put in, he was enabled to make this beginning. Leaving his partners in the house, he continued on the road, not willing, at this time, to relinquish the large trade he had built up, as the result of his in-

dividual efforts, but after three more years of travel, he forsook the road and route he had traveled for a period of twelve years.

At twenty-eight years of age, he was in fact as well as in name, the directing head of the dry goods jobbing house of Quentin McAdam & Company.

In 1890, he began his first enterprise in the manufacture of knit goods, to be followed by others of like import. The companies of which he is now the president and active head are the Utica Knitting Company, the Highland Knitting Company of Utica, N. Y., with a branch of the same mill at Sherburne, N. Y., and the Oriskany Falls Knitting Company, Oriskany Falls, N. Y.; the combined output of which is 1500 dozens per day. These companies have sales offices in New York, and only sell to the jobbing trade. Mr. McAdam also established at Utica, the Riverside Manufacturing Company, for the making of workingmen's clothing, which, however, he disposed of to his other partners, at the time of his retirement from the dry goods business, as it was properly an adjunct thereto.

In 1898, finding himself more and more engrossed in the knit goods business, an occupation most congenial to his tastes and aptitudes, and wishing to be able to devote himself unremittingly to its expanding demands, as well as to escape the arduous detail, incident to present dry goods jobbing, he disposed of this business to his other partners, Messrs. Rathbun & Company, and retired on January 1st, 1899. Mr. McAdam is a stockholder and director of the First National Bank of Utica, the Homestead Aid Association, the Savage Arms Company, and is also a charter member and director of the Utica Chamber of Commerce, and holds at present the position of first vice-president and chairman of its executive committee. He is also a member of the Fort Schuyler Club.

He has never speculated nor sought the accomplishment of business designs by any indirections. The books of his companies are always open for the inspection of any stockholder; he early established his credit in commercial circles, by keeping strictly his business promises. His word is as good as if set down in writing. This adherence to strict integrity has been a great help to him in his business and his enterprises have always been dividend payers.

He delights in forming and carrying out an enterprise on original lines and then see it grow. The make-up of his mind is for leadership and command, else to remain out. This is not so much that he does not trust others, as that he believes in himself. Earnestness, sincerity of purpose, solidity of judgment and a tireless energy,—these are the qualities going to make up his business capacity.

As Mr. McAdam is still a comparatively young man, with a sound mind in a sound body, it would not be fair to him to say he has reached the height of business accomplishment.

His own idea would probably be that he has just begun or rather reached that point where it is easier to accomplish greater results than any he has thus far achieved.

—Peroxide of hydrogen has no action on the wool fibre, but almost immediately destroys the coloring matter and forms without doubt the best bleaching agent for wool.

—In using adjective dyes it must be remembered that mercerization increases the affinity of cotton for mordants as well as for dyes, and that consequently less of the former than of the latter must be used.

—Mineral acids, unless very concentrated, have practically no action on the woolen fibre. This property of wool is made use of in the separation of cotton from rags containing both, cotton and wool; by the action of acids the cotton is disintegrated or "carbonized" and can then be easily separated from the wool remaining unaffected.

CENSUS STATISTICS OF MANUFACTURES.

Director Merriam of the Twelfth United States Census has completed his statistical staff by the appointment of S. N. D. North, of Boston, secretary of the National Association of Wool Manufacturers, as chief statistician in charge of the manufacturing industries of the country. The director regards this branch of inquiry as in many respects the most important in the new census, owing to the extraordinary growth of our exports of manufactures, and the sudden development of great industrial combinations among our manufacturers. These new phases of the situation make the collection of the statistics of manufacturers more difficult than ever before, and call for some radical changes and improvements in the old methods of gathering and presenting the figures, which have been subjected to much criticism, both by business men and economists.

The delay in making the appointment was due to the fact that Mr. North was a member of the Industrial Commission, now engaged in an elaborate investigation of the existing relations of capital and labor in the United States, and that he was unwilling to abandon that work for another branch of government service which seemed to involve his residence in Washington and the resignation of his position as secretary of the National Association of Wool Manufacturers. Both of these difficulties were finally solved in a manner satisfactory to all concerned. President McKinley, on Director Merriam's request, gave his consent to Mr. North's transfer from the Industrial Commission to the census work, and appointed Col. Albert Clarke, secretary of the Home Market Club, as his successor and the representative of the New England manufacturing interests on the Industrial Commission.

Director Merriam authorized Mr. North to organize a branch census office in Boston, where all the preparations for taking the census of the manufacturers will be carried on. Mr. North has been fortunate in securing, as his chief of division, Mr. William M. Stewart, who occupied the same position in the eleventh census of 1890, and is thoroughly familiar with the details of the work and thoroughly capable of handling them.

When the work of tabulating the returns begins, a year hence, the office will again be transferred to Washington, to the new building which is about to be erected there for the census office, and the tabulation will be carried on under the direct supervision of Mr. Stewart, with a force of a thousand or more clerks, the plan being to complete this branch of the work, if possible, within two years from June, 1900, as required by the new Census act. Mr. North, with a smaller clerical force, will remain in Boston to prepare the text of the final report, visiting Washington at brief intervals, as his presence may be required there.

The governor and council of Massachusetts have courteously tendered to the manufactures division of the census office commodious and well furnished rooms in the Commonwealth building, where a force of fifteen or twenty clerks is already at work under Mr. North. This force will list, from trade and city directories and other sources, all the manufacturing establishments in the United States, probably 400,000 in number, and there will thus exist a complete check upon the work of enumerators and special agents in the field.

Mr. North hopes to be ready, by the first day of June next, to begin the canvass of all the manufacturing establishments of the country simultaneously with the count of the population, and thus to avoid the delays and embarrassments which have so seriously impaired the value of the work in past censuses.

It is a vast and perplexing work, and the United States is the only country in the world which undertakes a systematic and exhaustive

canvass of its manufacturing industries. Mr. North's qualifications for organizing the work have been shown in two previous federal censuses, where he had charge of special inquiries, and by the variety and accuracy of his statistical work in connection with the Wool Manufacturers' Association, and as secretary of the Senate Finance Committee in two tariff revisions. He is one of the very few statisticians in the country who has made a special study of manufacturing statistics, and it was by reason of his work in this field that Director Merriam sought and secured his services as chief statistician for manufactures.

TRUSTS AND COMBINATIONS.

A conference under the auspices of the Civic Federation of Chicago will be held in that city next September, to consider important questions affecting trusts and combinations, with special reference to legislation concerning their control. We are not familiar with the motives or objects of this Federation, but some respectability is given to the coming meeting by the reported acceptance of invitations to attend from such persons as Prof. J. B Jenks, professor of Political Economy Cornell University; John B. Clark, Columbia University; Francis B. Thurber, president of the National Exporters' Association; Henry C. Adams, statistician of the Interstate Commerce Commission; and a representative body from the Board of Trade and Transportation, New York. Many of these invited ones, we are informed, have accepted with the express understanding that they do not necessarily endorse any of the proposed schemes that may come before the meeting. Their attendance, however, will give the conference a character.

There is no doubt that many direct benefits may be derived from the combination of allied industries, in the way of cheapening the cost of production and the consequent ability of placing manufactured goods upon the market at more advantageous prices. All of this can be done without resorting to a cut-down of the laborer's wage, but by taking advantage of such economies as are possible only as the result of business concentration. The vital question, however, is: Will all of the possible benefits become realized and the consuming public partners in them? Experience, however, has shown that while much good can arise from combination, the philosophy of the scheme is never carried out in practice, and that while a reduction in price might be a natural result of combination, the formation of the latter is tacitly understood as adverse to a reduction, and, rather, that its purpose is to sustain, if not advance, prices. If the latter have come down under combinations, it has been due to conditions which could not be resisted. Combinations eliminate competition, or reduce it to a minimum, which never tends to the lowering of prices.

The real test of the advantages to be gained by these combinations will come when times are bad. During the present days of prosperity things will run along smoothly enough, no doubt, but the day of reckoning is to come. The elements of danger in the passing of control of successful establishments from the management of owners to that of hired superintendents have been recognized in many instances by keeping the properties under the existing superintendency. The capitalization of the trusts that have recently come into existence, as is well known by our readers, is declared by the promoters as not being unreasonably large, as it is based upon the earning capacity of the various properties for the last four or five years, which were, as is well known, years of depression. If these earnings could be realized during these years of depression, the natural question is: upon what has the business community based its complaints for these years, and have times been as hard as many have tried to make out? If the capitalization of these combinations can be made equal

to double the real investment of capital, and a good percentage of earnings made thereon, there have been in past years, extremely high rates of returns upon the actual investments.

Much of the capitalization of these combines is based on the good will of the concerns that enter into them, and this good will is dependent upon the retention of the present management of the properties; but this management will in time pass away, leaving the operations to some hired superintendent. This scheme, while in a measure a good one, is still an evanescent one, and unsatisfactory to capitalize on for future dividends.

As we have remarked in previous issues, there will be considerable national and state legislation affecting combinations, the only danger being that a socialistic or populistic influence may carry such to an extreme. These anti-trust laws which have been passed by several states, while having a good object in view, are usually so framed as to be antagonistic to the very purposes for which they are constructed. The State of Texas has an anti-trust law, which the governor has just approved, and is an example of this kind, though entitled to the credit of an earnest effort to abate an evil. This State law is broad and drastic in many of its features, laying liable to it not only combinations, but single individuals, "if they shall, with the intent, or purpose of driving out competition, or for the purpose of finan cially injuring competitors, sell at less than the cost of manufacture, or give away" the articles in which their competitors deal. The legal machinery of the State is directed to the execution of this law by making it a pecuniary object for the State officials to prosecute any violation of it. There is such a thing as making the laws against trusts quite as bad as the evil which they endeavor to cure. Here is an example, possibly, as part of the Texas trust law, which is of doubtful constitutionality. One of the sections of this law reads:

"Each corporation, co-partnership, firm or individual who may be the owner or lessee of a patent to any machinery intended, used, or designed for manufacturing any raw materials or preparing the same for market by any wrapping, baling or other process, who shall lease, rent or operate the same in their own name and refuse or fail to put the same on the market for sale, shall be adjudged a monopoly, and be subject to all the pains and penalties provided in this Act."

Some of our readers will be particularly interested in this section. Here is an interference with the rights of a patentee, which are conferred upon him by the national constitution, which no state has a right to deprive him of. This section, however, can be easily circumvented, for, while the inventions are required to be put upon the market for sale, there is no limitation to the price at which they may be offered, not even so much that it shall be a reasonable sum.

CENSUS OF COTTON GINNERIES.

The assistant director of the 12th census has issued a circular relative to the gathering of statistics of the production of cotton, to be ascertained by reports from ginneries throughout the South. This has been suggested, it appears, by Harry Hammond, of South Carolina, as a feasible and most desirable object. In some respects, it has many points of value, in the enumeration of the ginneries that exist in the South, which are to the cotton industry of nearly as much tangible interest as the enumeration of the cotton factories. Whether the reports that may be rendered by the ginneries, showing the number of bales of cotton that are compressed by them, would be any better than those now in vogue for giving the cotton crop in bales and pounds, is a very serious question. We doubt very much if the present methods could be greatly improved, such as are carried out by the cotton exchanges and other means. A possible good to be accomplished would be that the two systems could

be made a check one upon the other, but this is of doubtful utility.

While cotton ginning is an industry of much importance to the South, we cannot agree with the circular that it is "by far the largest and most important manufacturing industry in the cotton states." It is a question, after all, as Edward Stanwood is reported as having said to the assistant director of the census, whether cotton ginning can be strictly brought within the category of a manufacturing industry any more than threshing can be classed in with wheat growing and flour making.

This circular states: "For a long time it has been known that the only approximately correct count of the cotton crop must be made at the gin houses." This sounds very well, but there is a factor that must be taken into consideration, and that is the general ignorance of ginners, incapacitating them in keeping to any system of figuring that can be relied upon. It would be much better to trust to qualified persons familiar with statistical manipulations, as are empipoyed by the cotton exchanges of the country, who are able to make their estimates upon the receipts and shipments at the exporting and interior ports. It is suggested in the circular that an effort be made in 1900 to obtain at each ginnery a statement of the number of bales ginned from July 4, 1899 to March 1, 1900. Of course, it is too late to undertake anything of this kind beginning with July 4, 1899. A later date will have to be accepted, and although by March 1 nearly all of the cotton produced for the current season is ginned, still, there is some left that should be taken account of in some manner. Our idea would be to take a census of the gins, and let the counts of the ginners (who are more familiar with chalk and the blackboard than they are with any plan of arithmetical calculation) go.

—Occasionally when scouring the best qualities of wool a little chloride of ammonia-sal-ammoniac is added to the soap solution. This has the effect of rendering any free caustic alkali present harmless to the wool.

TRADE.

At no time, except immediately after the passage of the present tariff law, has the wool market been in such an excellent condition, as it is now, for sustaining prices. The supply of desirable wool is quite within the limits of the demand, if it does not greatly fall short of it, not only in this country, but abroad. This condition has been growing for the last number of years, especially in relation to the supply of fine wools. We think that woolen manufacturers would make no mistake if they laid in large quantities of wool at present prices, as the prospects are far more favorable for an advance than at any time within the last twelve months. Even Territory wools are difficult to obtain at less than 52 to 54 cents clean, and at 50 cents clean they approach an export basis, and at 45 to 47 cents clean such wools would be swept out of the market by the foreign demand in less than a week. The world is experiencing a scarcity of wool, which has been foreseen for a number of years past. This is due to various causes, the principal ones of which are the encroachment of agriculture and manufactures upon the pioneer occupation of sheep husbandry, and to the potent fact that the raising of sheep has been tending towards producing an animal that will furnish mutton for food, rather than wool for clothing.

Little, or practically no wool is now being imported, except for manufacture into carpets, and the quantity for this latter purpose is below the usual mark. For the first eleven months of the past fiscal year, the amount of foreign wool that entered into American consumption, for clothing purposes, did not exceed six million pounds. Nearly the entire amount of wool that was imported for this period was again exported, the export being particularly heavy in May.

The cotton situation, as regards the raw material and manufactured goods, is in a fairly satisfactory condition, especially for the latter. The American cotton crop that is now growing is still an uncertain factor, so far as its probable size is concerned. It will require, according to the best estimates, at least 10,500,000 bales, and that a crop of even eleven million bales, similar to that grown last season, would not result in any depression in the current prices. The present indications do not point to a larger crop than will be necessary to meet the ordinary wants of spinners. There is yet an opportunity, due to climatic influences, for a material falling off in the harvested crop. The total amount of cotton that has been marketed since September 1st, up to the present writing, is about 10,850,000 bales. The total visible supply in the world is about 650,000 bales in excess of what it was at this time last year. The visible supply is unusually large—larger than ever before, at this time, the excess being chiefly of American cotton. There is much to lead one to think that the cotton crop of this year will be one not exceeding the average, per acre, because of the backwardness in the early germination and stand of the crop. This lateness in the appearance of the crop is somewhat offset, however, by the fact that the fields have been generally in good shape, though the use of artificial fertilizers is somewhat less than it was last year, especially in the Atlantic sections, where they are most needed.

There is not a large stock of cotton held by European mills; in fact, there is less in the mills of Great Britain than last year at this time, while on the Continent the mill stock is about the same.

Custom House statistics, for the first time, we believe, show an importation of cotton waste or flocks. About 500,000 pounds of this waste is coming into our ports monthly, on an average, at a value of a little over 3½ cents per pound. About one-ninth of the quantity of raw cotton that is now being imported is coming in the shape of cotton waste.

AN APPRAISER'S TENURE.

The provision of the law affecting the tenure of office of a member of the Board of General Appraisers, is for the first time to come before the courts for its construction as to the power of removal by the president, in a case brought by F. M. Shurtleff, formerly one of the general appraisers at the port of New York. Mr. Shurtleff will have for his attorney, Ex-Secretary of the Treasury John G. Carlisle, who is thoroughly familiar with the laws pertaining to the treasury and to the custom house. The law requires the appointment of any member of the Board of General Appraisers, by the president, shall be confirmed by the Senate, and when so confirmed the removal of this official cannot be effected only for "inefficiency, neglect of duty, or malfeasance in office." It now appears that Mr. Shurtleff's successor (I. M. Fischer), has not been confirmed by the Senate, and he holds his office by a simple appointment by the president. Two questions will be raised; one, whether Mr. Fischer's appointment is legal, assuming that there was a vacancy to be filled, and whether the cause or reason for Mr. Shurtleff's removal was a good and sufficient one under the law.

RAMIE.

The use of ramie, one of the most valuable textile fibres produced in the vegetable kingdom, has not yet become at all general, because of well-known difficulties that, thus far, have not been overcome satisfactorily, although constant, but slow, improvements are being made in this direction. There is no vegetable fibre, other than cotton, that has so many valuable features, characteristic of real usefulness in the textile industry, as ramie. It is far superior to flax, which ranks second to it in length of fibre and in fineness and lustre. It also approaches

nearer to the pure cellulose than any other fibre suitable for textile purposes, other than cotton, which is the prototype of all fibres in this particular. The fact that fabrics made from ramie are more durable and less liable to rotting, is due to the exceptional length of the ultimate fibre, which gives the woven article greater tensile strength and less propensity to disintegration.

There have been many efforts to decorticate ramie upon a commercial scale. The difficulty has not been so much in being able to obtain a machine that will perform the process of decortication, as one that will turn out a necessary quantity so as to bring the cost to a sufficiently low figure to make it profitable. Efforts in this direction have been carried on for nearly a half a century, without being a great deal nearer to the goal than when the first attempt was made.

The fibre is particularly valuable for yarns and fabrics requiring great tenacity, or where a high resistance is required against the injurious effects of moisture. This applies to fishing lines, nets, etc.

We read, however, of progress being made toward attaining all of these desirable ends, but, heretofore, devices have been laid one side after practical experience sufficient to test their efficiency. The process of ungumming is a simple one, and so is that of decorticating; the only difficulty, as we have stated, being that of bringing the cost of this latter method down to a commercial basis. Attempts have been made to decorticate ramie by the use of chemical agents, but they have failed, because of the weakening effect had upon the fibre, due to the action of the acids employed. There are two ramie factories in France, we believe, but their supply of material is still obtained from Asiatic countries, especially China, where the fibre is prepared by hand, at a low cost by the cheap labor there employed.

A new method has recently been introduced for decortication, as the invention of C. L. Bachelerie. How important this method will prove is still an open question, although highly spoken of by some of our English exchanges. It is referred to as possessing the advantage of simplicity, requiring no motive power or fuel, and as not affecting the quality of the fibre. It is described as a process based on the property possessed by carbonic acid. It would have to be carried on, however, where the ramie plant is grown, so that the stems may be taken in their green state and submitted for a comparatively short time, say five minutes, under a pressure of 1½ atmospheres, to the influence of carbonic acid gas prepared in the cold, by acting on bi-carbonate of soda, with hydrochloric acid. What effect this gas has upon the fibre is not seemingly clearly understood, but it is believed that in the process of disengagement the gas carries along with it some of the molecules of the hydrochloric acid, and by the aid of the atmospheric pressure, conveys them into the substance of the stems under treatment. This produces a disintegration of the woody and gummy matters, which can be removed by pressure when the stems are dry. After this is completed, all that is necessary is to pass the stems through a breaker press, whereupon the whole of the woody matter and a portion of the gum breaks away and falls down.

There is a ramie syndicate in England, working under Burrows & Radcliffe's patents, which is meeting with as much success in this line of manufacture as any concern that we are familiar with; still, the fibre used by this syndicate is procured from China, the decortication being accomplished by hand labor. The machinery suitable for spinning this fibre has to be made especially for it, and the best results are obtained by what is known as the "wet" process, which produces a thread without the objectionable hairiness common to some yarns, the removal of which cannot be safely done by singeing, as experience has shown that this process weakens the yarn.

RECENT EXPERIMENTS IN COTTON CULTURE.

HENRY G. KITTREDGE.

Lecture, with Stereopticon, under the auspices of the Fall River Board of Trade, Fall River, Mass.

(Continued from June.)

Fig. 9. The branch of the Mit-Afifi plant that is now shown you, is for the purpose of exhibiting the relative arrangement of the foliage and fruit. The latter is indicated by A. A. A. The bloom, the unopened boll, and the opened boll with the cotton exposed, are shown. The plant from which

FIG. 9.

this branch was taken, was topped five feet above the ground. The size of the main stalk was two inches in diameter at the butt, and the plant bore 91 fully matured bolls, forms and young bolls. The Mit-Afifi is the principal variety of cotton raised in Egypt, and is taken as the typical cotton of that country. Its fibre is brownish yellow in color, of good strength, and fine. Mr. Wentworth's sample compares favorably in these respects. Its color is very much in its favor in the production of certain fashionable lines of goods; and imitation of it is frequently attempted upon American cotton by the use of dyes.

Fig. 10. We have now before us two branches of the bamia variety, taken from two plants, one that had had its top cut off, and the other whose main stalk was allowed to grow to its natural height. Attention is solicited to the clustering of the bolls, A. A. A. At B. B. B. the bolls are bunched. This variety of Egyptian cotton grows on a branchless plant, the fruit appearing on small stems ramifying from the main stalk. Bamia seeds have been tried before in Texan soil, some having been planted on land at the head of Galveston Bay about 1877, but with indifferent success. It is not as favorably thought of as the Mit-Afifi, though it stands next to that variety in its extent of cultivation in Lower Egypt, where it was first discovered, by a Copt, in 1873. It has been longer known than the Mit-Afifi, compared with which it is inferior in fineness, strength and uniformity of staple.

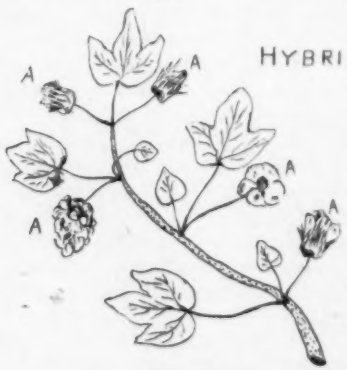
Fig. 11. I now exhibit a branch of Mr. Wentworth's hybrid which he speaks of as possessing great drought-resisting characteristics. There is nothing peculiar about the arrangement of the foliage and fruit on this branch; the bloom, boll and open cap-

FIG 10.

sule being observed at A. A. A. The plant from which this was taken had 66 matured bolls, forms and young bolls. Its height was four feet, and the size of the main stem at the butt was 1½ inches in diameter.

The samples of Mr. Wentworth's

cotton (Fig. 8) which have been exhibited, were the product of the fifth crop from seed obtained from the Department of Agriculture, Washington. His method has been to select the best matured bolls from the choicest stalks for his planting seeds. If necessary, he tops the plants. He has tested it in different soils, and in every instance, where an early stand was secured, the yield was good. He tells me he has no fear of failure for his cotton anywhere in the South, where our common varieties have a six-months' growing season. So far as fibre is concerned, his cotton shows no degeneration after five seasons' trial. It is the nearest to a success of any series of experiments in raising long-stapled and fine-fibred cotton from Egyptian seed in this



FIG, 11.

country, coming within my observation. Some of his cotton has been sent to northern manufacturers for trial. An impediment in the way for a satisfactory introduction of his cotton is the small quantity that can be supplied. As I have before remarked, spinners do not like to limit their supplies of cotton to small lots. But Mr. Wentworth proposes to distribute his seed among planters and extend his own acreage. His yield of Egyptian seed cotton has been a sixth more than that of his common upland, per acre; attained, only, after several seasons of disappointments. Mr. Wentworth is certainly deserving of encouragement in his efforts, in succeeding where so many have failed. Others obtained seeds from the Department of Agriculture when he did, but met with such discouraging failures that they abandoned all further efforts. He continued, though his first crop gave him only 75 pounds of seed cotton from three acres. Experiments, heretofore, with exotic varieties of cotton have

FIG. 12.

not turned out satisfactorily, as a rule, compared with results that can be accomplished with those more indigenous to the soil and climate. Still, it should be remembered that our own Sea Island and other home-bred cottons are of an alien ancestry. The experience of our experiment stations in the South has not been a felicitous one in the cultivation of cotton from exotic

seeds. The director of the Georgia Experiment Station tells me that he has planted seeds from all parts of the world, and has never found a variety possessing any merit whatever, in comparison with our own native varieties. He tried the Mit-Afifi and bamia during two seasons and found them utterly unsatisfactory, far inferior, in every respect, to Sea Island grown under the same conditions. He recog-

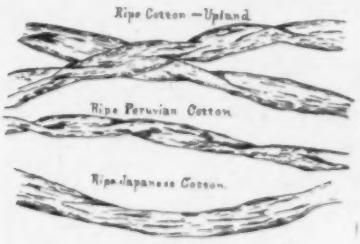


FIG. 13.

nizes, however, that Mr. Wentworth is experimenting on a soil of different characteristics and with quite different climatic conditions. Similar observations have been made by others, notably by the director of the Mississippi Agricultural Experiment Station, who writes concerning Egyptian cotton that "the Mit-Afifi and bamia are the two varieties which have been the most widely tested in this country, but neither has proved profitable. Both produce a very long and fine staple, but mature too late for our climate." He alludes to the propagation of a number of hybrids between them and some of the American upland varieties, within the last few years, which promise to have considerable value, especially in the more southern parts of the cotton region.

Fig. 12. My microscopic examinations of the cotton fibres of Mr. Wentworth's cotton revealed some characteristics that are not uncommon to cotton fibres in general, but which may possess something of interest to many who are not every way familiar with the structure and peculiarities of the cotton fibre as generically constituted. The view before us is a photo-micrograph of well formed, mature cotton fibres. They show good body, fully developed, and with a fair supply of twist. These fibres are what spinners like to get hold of as assuring good work.

Fig. 13. We have here another view of matured cotton fibres drawn with the aid of the camera lucida attached to the microscope. The delineation is that of four-hundred diameters' amplification. Three varieties of fibres are to be seen; a most excellent one in the American upland, and a very poor one in the Japanese. The Peruvian fibre is a good one.

Fig. 14. That an idea may be had of how immature cotton fibres look, the view before us is presented. These are exact drawings with the aid of the camera lucida, of fibres magnified four hundred diameters. It will be noticed that the fibres appear flat and thin, with some folds, but no twist inherent to the fibres. Immature cotton fibres are known by these distinguishing features.

Fig. 15. With the last three views in mind, the significance of the present one will, no doubt, be clearly understood, as showing the difference in the development of the bottom and the

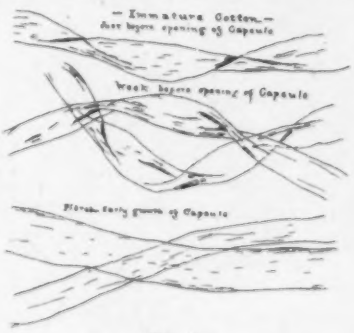


FIG. 14.

top of the cotton fibres from Mr. Wentworth's samples. Attentively note: the Mit-Afifi fibre is well developed at the bottom, and of smaller diameter and not so well formed at the top; the abbasi is only fairly well developed at the bottom and the same at the top, which is also of less diameter; the hybrid is poorly developed at the

bottom and immature at the top; and the bamia, while of good body has but indifferent twist at the bottom, with a comparatively good top, but less in diameter. For uniformity of structure from bottom to top, the bamia shows to the best advantage and the hybrid to the poorest. These observations should not be taken as prejudicial to Mr. Wentworth's cotton, as they are not uncommon to all varieties of cotton, especially that of the tops being known because unseen. No system of cultivation can prevent this, as a properly developed fibre depends on proper climatic conditions affecting a vigorous growth. Weather is as potent as the sustenance obtained from the soil. The latter can be regulated but the former cannot be.

Fig. 16. That what has been shown may not be taken as isolated instances affecting any particular kind of cotton, of the tops of fibres being smaller

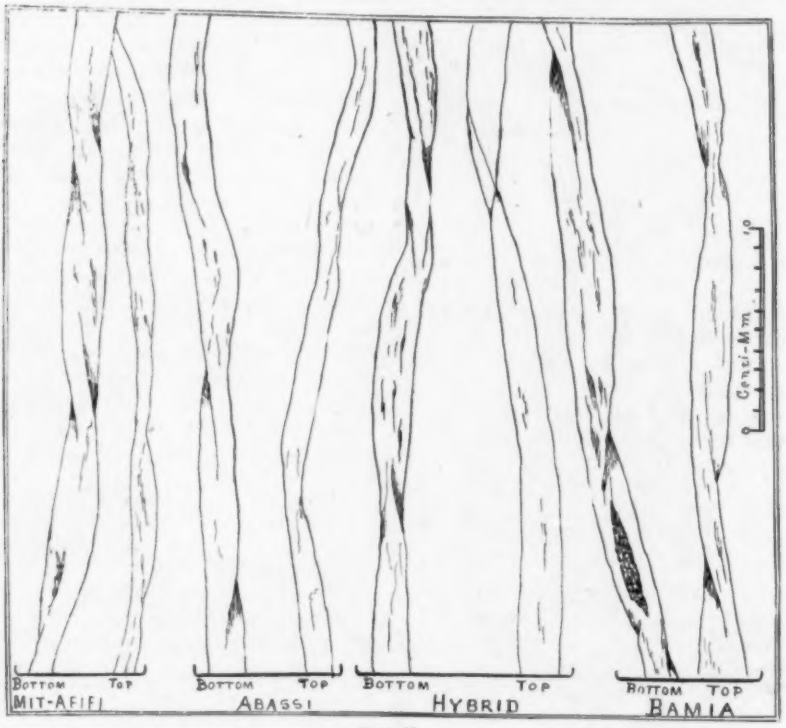


FIG. 15.

of less size than the bottoms. As can be readily appreciated, uniformity of development and of size, the entire length of the fibre, is a desideratum of the utmost importance from a manufacturer's point of view. The spinning quality and economy—in the matter of waste—of his cotton largely depend on it. An imperfectly developed fibre is a source of waste and of weakness which manifests itself in the manufactured product, the cause remaining unthan the bottoms, I desire to call your attention to a diagrammatic exhibition of the relative size of the bottoms and tops of fibres of four representative varieties of cotton. As will be seen, the tops of the fibres of Sea Island cotton; of the Allen, or a Mississippi bottom-land, cotton; of the Peterkin, or a typical upland, cotton; and of the Chinese, or common Asiatic, cotton, are of less diameter than the bottoms.

Fig. 17. The view that is now before us will give an idea of the appearance of the tips of cotton fibres. Though the conformation of the tips, here shown, vary, the variation is common to all varieties.

Fig. 18. The grotesque appearance of the roots of cotton fibre may be seen in the view now before us. No variety of cotton can lay claim to any distinguishing peculiarity in the forms of its roots, more than that there are more points of penetration with the upland than with the Sea Island variety. I give these views as of passing interest as coming up in my examinations of Mr. Wentworth's samples of cotton, but which may be associated with the structure of all cotton fibres, and which it is well for all spinners and workers of cotton to be familiar with.

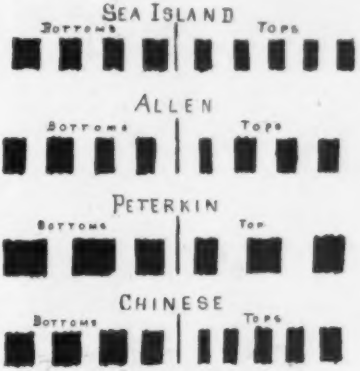


FIG. 16.

Fig. 19. Though Mr. Wentworth has been instrumental in having his experiments exploited in the newspapers of the country, a citizen of Atlanta, Ga., T. A. Jackson, has been equally, if not more, energetic in exciting public attention to some of his own efforts in cotton culture from seeds that he claims came from the interior of Africa, and are totally different from any variety known in the United States. The plant has been styled Jackson's African Limbless Cotton. Three stalks of it are exhibited before you. These three stalks are Mr. Jackson's trade mark. It will be observed that they are limbless and without foliage, showing nothing but a luxuri-

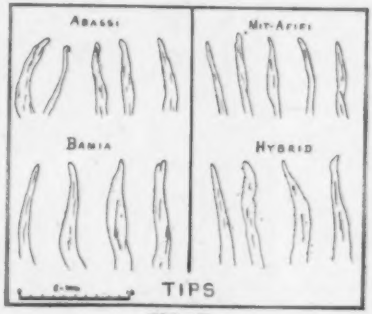


FIG. 17.

ant growth of cotton in the boll. Nothing could be conceived of handsomer than this, exhibiting the fruitage of the cotton boll. Mr. Jackson has written me that the plant grows from 12 to 14 feet high, yielding 40 pounds of lint to 100 pounds of seed cotton, and "grows in a straight stalk, absolutely limbless, averaging 150 to 175 bolls to a stalk." At first, he asked a cent apiece for his seed, equivalent to $1800 a bushel. He writes that there are but few imperfect seeds, as nearly all of the blooms mature, and are from 10 to 12 days earlier than any other cotton raised in his neighborhood. To make a successful crop, he says, the plants should stand about

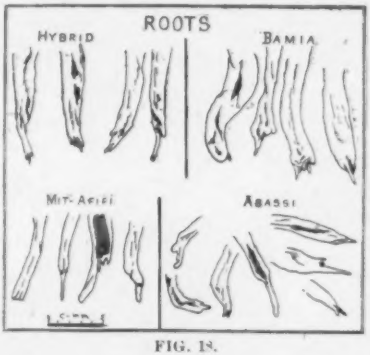


FIG. 18.

four inches apart in drills, which will give 630 plants to a row, and with 10 productive bolls to each plant a yield of 6300 bolls is obtained, or, allowing

100 bolls to a pound, 63 pounds of seed cotton to a row. Seventy rows per

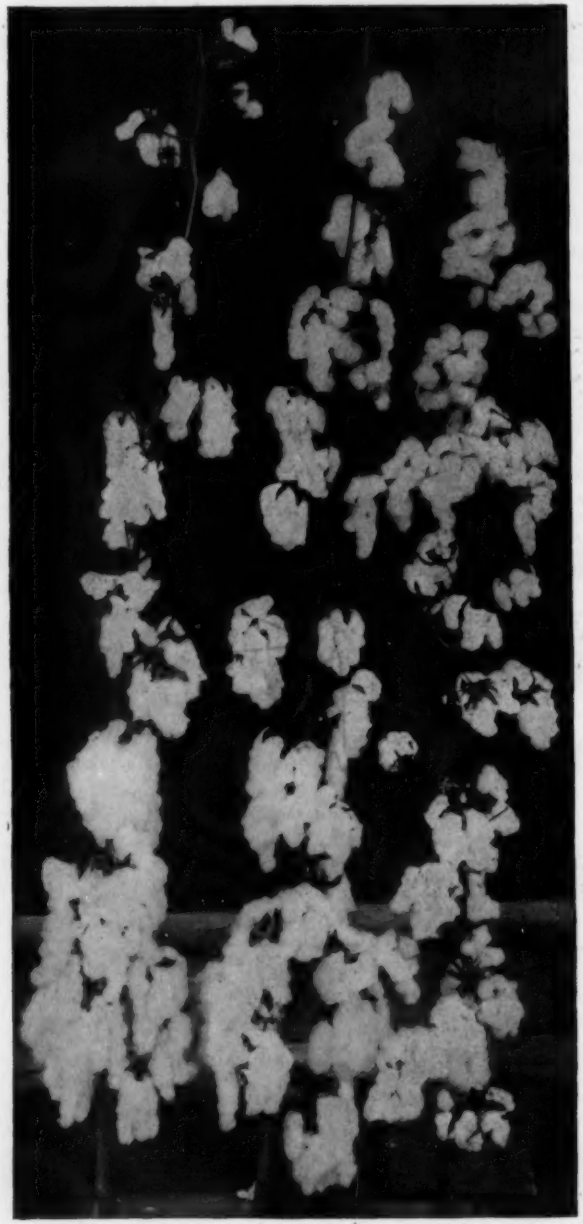


FIG. 19.

acre, therefore, would give a production of 4410 pounds of seed cotton. The illustration of the three stalks,

after all, should not be taken as truly representative of Jackson's cotton, in that the foliage has all been removed, and a number of the slender stems, apparently, broken or cut off, for the

seeming purpose of exposing the open bolls to full view and of concentrating the attention to them. In this respect the illustration is deceptive as to the true appearance of the plant as it grows in the field, but, with this explanation, it need not be criticised, as the retention of the foliage would have concealed the cotton. I have received accounts of the planting of this cotton from three sections of the South, one of three acres in North Carolina, another of five acres in South Carolina, and another of six acres in Louisiana, with most satisfactory results, showing yields much in excess of that from ordinary upland seeds. The plant has a large leaf, and in the three fields just referred to grew to a height of five to ten feet. The planting of the seed in the five-acre South Carolina plat was in rows four feet apart, the stands being 10 inches apart. The planter writes me that last season's drought prevented his cotton coming up properly, and in consequence appeared several weeks behind time, with a loss of about 20 per cent. of the bolls failing to open. This planter is of the opinion that this variety of cotton is a late one, which somewhat militates against Mr. Jackson's statement.

Fig. 20. That another view may be had of this so-called limbless cotton,—which, as a matter of fact, is not limbless, if left to grow after its own nature like other cottons,—we give the illustration before us, showing how it appears in the field. Its height can be judged of comparatively, from the heights of the negroes seen standing by the side of it. By close observation, some of the foliage may be seen, the large leaf, etc. On some of the stems a considerable number of the leaves have, evidently, been cut off, for the presumed good purpose of exposing to view the bolls and their arrangement.

FIG. 20

Reverting to the five-acre South Carolina plat, the soil of which is of ordinary clay, the owner informs me, that, notwithstanding all drawbacks, his last season's production was nearly eight bales of cotton, for which he

expected to get fully a cent a pound more than the price of the same grade of ordinary upland cotton. Many of his plants had 50 to 75 bolls on them, and he reckoned an easy average of 55 bolls per plant.

There has been a great deal of romance about the origin of this so-called African Limbless Cotton, as being first discovered in the Congo country of Africa, and brought thence by a Jew named Kyle who sold the seeds to Mr. Jackson. The claims of this Jew are of very doubtful credibility. The fact, however, seems to have been established in a recent case before a United States court in which the Jackson African Limbless Cotton Co. appeared as the plaintiff, that Mr. Jackson did purchase a few cotton seeds of a Jew, in the early fall of 1895. The methods pursued for disposing of the seeds of this cotton, the exorbitant price asked for them, and the claims persistently made concerning the merits of the product, have been discussed and animadverted upon in the public journals, especially in the South. Statements that have been made to me by those who have purchased this seed, regarding production, etc., I have been somewhat obliged to receive with much incredulity, because of their seeming extravagance. Still my examinations of the samples of staple sent me from different sources have impressed me most favorably concerning their spinning qualities, in the development and length of fibre, though the latter point is almost invariably overstated.

Though the length of staple is very good (Fig. 2), it is not extraordinary, as one is led to believe from the reports that are made by the enthusiastic planter. I do not always find in the planter's sample the characteristics that he declares exist. The staple on the seed, as shown in Fig. 2, may be compared with other well-known varieties. It is longer than the Peterkin or Herlong, but shorter than the Johnson. It is a good one-inch stapled cotton. Even this length for a cotton raised on the uplands of the Carolinas and Georgia is better than the ordinary, and would seem to be capable of a better record on the rich bottom lands of the Mississippi River valley.

FIG. 21.

Fig. 21. A further idea of the height of Jackson's cotton may be had from the view now before us of a field of common upland cotton, in which a number of negroes are picking, all stooping while in the act of plucking the cotton from the branches. The men and women in their standing pos-

tures loom well above the tops of the plants. There can be no hiding behind the bushes in such a field.

My analysis of the open bolls that have been sent me has shown that they have four to five cells each, with an average of about nine seeds, constituting about 65.5 per cent. of the weight of the seed cotton. This gives a yield of 34.5 per cent. of lint. In no instance have I been able to get 40 per cent. as claimed to be the average production. This percentage of production would be a most extraordinary one. That it is, however, a large producer of lint would seem to be sustained by the tests made of it at the Georgia Experiment Station with other cottons under like conditions as to soil, fertilization and cultivation. According to the record of tests made of twenty-one varieties of cotton, the Jackson limbless ranked third in value of total product of lint and seed. Its record showed a yield of 1366 pounds of seed cotton or 507 pounds of lint per acre, against an average of the twenty-one varieties of 454 pounds of lint. The percentage of lint from the seed cotton was 37.1, which gave it first rank, with one other variety, in this respect. Its seeds are comparatively small, ranking second in the foregoing tests, showing 5,159 to the pound. This is a better record than I have been able to obtain from the samples sent to me, though mine was exceedingly good.

It is a matter of secondary moment as to the origin of this cotton. Many of the stories about it are unquestionably pure fabrications. Whence it came is of no consequence to the spinner or even to the planter. That the cotton has some valuable points in its favor admits of no question. Its fibre is supple, well formed, and of good length. Its yield of lint to the hundred pounds of seed cotton is excellent, or above the average, and its production per acre is very good if not high. Taking it all in all, it is one of the best varieties of cotton that has come under my observations.

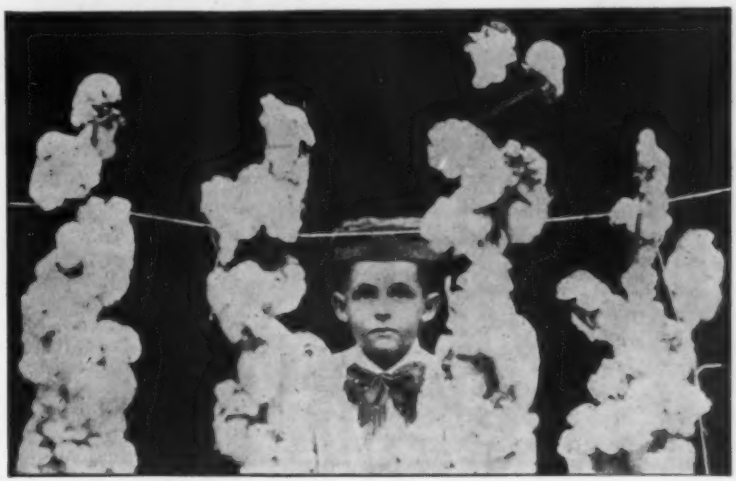


FIG. 22.

Fig. 22. There is an impression that the so-called African Limbless Cotton, which is, undeniably, a misnomer, is nothing more nor less than that variety or breed of cotton known as Welborn's Pet, a picture of which is now before us. The cotton was named after the little fellow seen in the centre, Jeff. Welborn, Jr., who was his father's pet and little companion in the field. The stalks, as seen, Mr. Welborn writes me, are just as they grew. The leaves had all fallen off before the cotton had opened, as they always do.

The string was used to hold the stalks in place while they were being photographed. This cotton is described as erect, slender, limbs short and numerous, very prolific, clustered, and maturing early. It is one of the best types of cluster cotton in the South. Whether Jackson's and Welborn's cottons are the same or not is of no commercial importance, and the only thing to be accomplished in establishing their identity is to thwart any false or dishonest statement concerning either one, which has for its purpose the duping of unsuspecting planters.

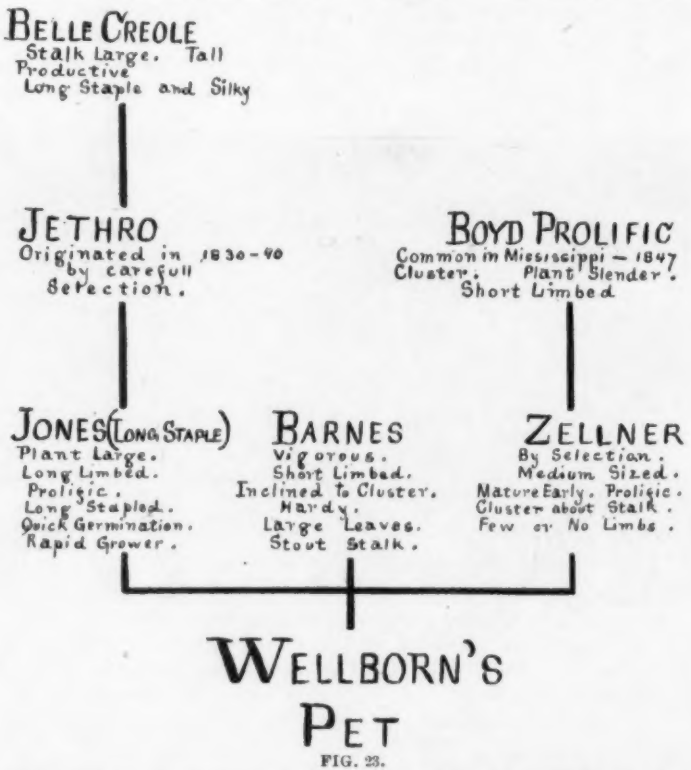


FIG. 23.

The specimens of Welborn's cotton that have been sent me exhibit many meritorious characteristics of value to the spinner. It is a cotton that spinners would naturally like to get hold of.

Carefully observing Welborn's Pet cotton with its single stalk and fully developed bolls, a re-examination of Jackson's cotton (Fig. 19) will impress you with their great resemblance, in the bush. Mr. Welborn's method of culture in attaining an ideal cotton, and then holding it there against every tendency of reversion, is of peculiar interest as an example of what enterprising planters have done and can do toward improving, and keeping to a standard, their cotton, as a result of an intelligent system of hybridization and selection. Welborn's Pet is the offspring of the judicious crossing of three distinct varieties, in the year 1881,—the Jones, Barnes and Zellner. Each one of these had its points of value, and it was the combination of the most desirable of these into one plant that was sought. (Fig. 23.) I will direct your attention to a pedigree chart of the Pet. The Jones was found to germinate early in the field, and grew rapidly, but like most rapid growing plants the fruit was scattered on long limbs. The seed was fuzzy and the boll large. The Barnes was

found to be a densely foliaged variety, and, as is natural with a dense growth, the leaves were large and thick, the stalk stout, and the seed green and fuzzy. The Zellner was found to be a small and compact plant, with few or no limbs, of the cluster class, having small, white seeds, two leaves to a bunch of fruit, and one leaf on the main stem, just where the fruit stem branches out. The fruit stems ran out from two to six inches, on each end of which appeared two to six forms or bolls.

Mr. Welborn saw his ideal in these plants, embodying the quick germination and rapid growth of the Jones; the hardiness, stout stalk and broad leaf of the Barnes; and the prolificness, rapid fruiting, clustering around the stalk, with few or no limbs, minimum of shade after fruiting began—the fruit taking the place of the leaves and early maturity—of the Zellner.

Rapid fruiting in the nature of the cotton plant begins when its growth is checked. The broad leaf means dense shade, rapid growth of wood and scanty fruit.

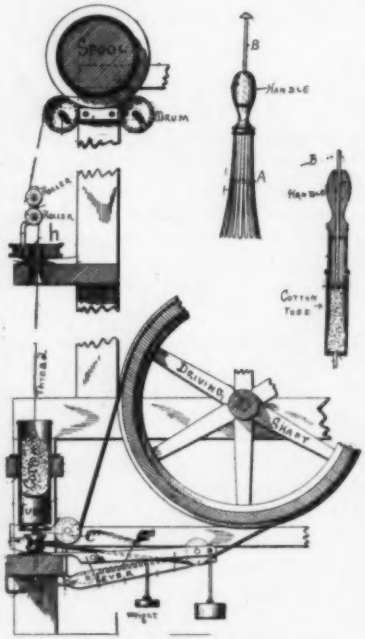
Mr. Welborn's scheme was to get and hold the cluster form or nature of the Barnes and Zellner, with only two leaves to the bunch of fruit, and drop them out when the fruit began to develop. This attained, his ideal would be realized. To this end, he turned his farm over to his brother and gave his whole time and work to a careful system of hybridization and selection of his cotton plants. What he accomplished is represented in his Pet. The pedigree chart is not without interest. The Pet is a cross or hybrid of three varieties, each one of which is the result of seasons of selection. Their history can be traced back several generations of man in the cultivation of cotton in the South. The Jones and Zellner have lineal records back into the thirties and forties, in the days of slavery, when, however, the same care and attention to hybridization and selection was not carried out as is the case today. If the recorded characteristics of the several varieties as described on the chart, and their final revelation in the Welborn Pet, are studied, a conception may be had of what has been and can be accomplished, and the skill and patience required, in an intelligent scheme for improving the staple and yield of the cotton plant, to meet the needs of the spinner and the planter. But hybridization and selection would be of but little avail if all the necessities of planting and after-cultivation were not intelligently observed.

Oriental Invention of a Spinning Process.

There has been recently taken out in the United States, letters patent, by a Chinaman, residing at Foo Chow, of a machine for spinning. There is no particular merit in the machine for American manufacturers, and it is not an invention that has any possibility of interfering with present methods, and, therefore, we refer to it and illustrate it at this time more as a curiosity than anything else, not only as coming from the source that it does, but for the principle that is represented in its construction and processes.

We think that the machine will be clearly understood if we confine our remarks to its operation, which is as follows: The cotton is placed in the receptacle formed by the strips A, the plunger B being pushed back against the handle, and the ends of the strips are compressed or bent inwardly and inserted in one of the cotton-tubes The device is then pushed into the tube until the ends of the strips reach the bottom of the tube, when by pressing upon the knob the handle and strips may be withdrawn, leaving the cotton in the tube, or the cotton may be inserted in the tubes in any other convenient way. The tubes after being filled are placed in the machine, the spindle of which bears on the end of the lever. A strand of cotton is secured to one of the spools (which is placed in position upon drums), and the strand is threaded between rollers

and through the hollow spindle "h" and the end of the strand is placed in the upper end of the cotton-tube. When all of the cotton-tubes have been thus pinned, power is applied to the driving-shaft to rotate the shaft, drum, and pulleys connected therewith. As soon as the cotton-tubes begin to rotate the fibres of the cotton will adhere to the ends of the strands inserted therein and will be twisted into a continuation of the strands, the spools meanwhile winding the strands up and drawing the fibres out as they



are twisted into the strands. The rotation of the pulleys at h and rollers carried thereby will smooth and polish the strands before they are finally wound on the spools; but these pulleys and rollers may be omitted, if desired. Should the cotton twist too tightly, the upward pull on the strand would be increased, and, assisted by the weight on the lever, would tend to raise the cotton-tube and decrease the friction between the spring underneath and the bottom of the cotton-tube, thus allowing the spring to slip sufficiently to decrease the speed at which the said tube is rotating, so that the cotton will not be twisted so tightly. By moving the weight along the lever the upward pressure on the spindle may be varied at will. Thus, for instance, should the weight be moved toward the end of the lever the upward pressure on the spindle would be increased and the amount of pull on the strand required to raise the cotton-tube and cause slipping at the point of contact with the spring would be decreased. This would result in a larger and loosely-twisted strand. Should the weight be moved near the fulcrum-point of the lever, the upward pressure on the spindle would be decreased and the amount of pull on the strand required to cause slipping at the point of contact of the cotton-tube with the spring would be increased and would result in a small tightly-twisted strand of cotton. Thus by moving the weight along the arm of the lever, the quality of the strand of cotton may be varied at will.

Japan's Silk Industry.

The Japanese have an innate love of the beautiful. These characteristics attract the Japanese to the culture of silk, and adapt them to the industry. From start to finish it is a fine art, requiring peculiar attention and delicacy in all the several processes. The thrifty and tactful wives of country farmers appear to love their silkworms as their children. The mass of people do not try to obtain eggs from their moths. It is an art by itself to be able to have moths lay eggs evenly upon paper, and the general producers of silk do not undertake it, but purchase carefully selected eggs of some trustworthy dealer, and store them till the proper season. These eggs are white at first, but in time they change color into a brownish black. As the spring sun warms the earth, generally about May 1, the color of the eggs turns to blue, which indicates that the period of hatching has arrived.

From this time on, writes an American observer in the New York Trib-

une, for forty days and nights the caretakers of the silkworm do not remove their clothing for rest, but sleep with one eye open. If there should be sudden changes of weather after the eggs are hatched, or a damp, cool wind should strike them, some of the worms, unless instant relief were given, would die.

It will be well to note the infinite pains these women take to rear the caterpillars and produce the best quality of silk. After they are hatched they are so tiny and delicate that it requires great care in transferring them to another sheet of paper for feeding. This is generally done with a soft feather, and so deftly that no shock or injury comes to the worm. Then they are fed mulberry leaves in small pieces eight times a day, care being taken to put in but a small quantity each time. On the fifth day they begin to refuse to eat leaves, and remain two or more days in a stupor. On the eighth day they revive, and are fed larger quantities of leaves. This continues for five days, and again they become stupid for two days.

The alternate activity and stupidity continue for five periods, requiring constant care from 4 A. M. till 11 P. M. daily. The quality of the silk largely depends upon the vigor of the worms, enabling them to consume a large quantity of leaves. When the caterpillars are mature, hundreds of peculiar little bridges are made, varying in form, but all aiming at the comfort of the worm, on which they spin their cocoons. Healthy worms will ordinarily spin their complete cocoons in twenty-four hours, but these are generally left undisturbed for a week, when the worm is pricked to destroy it, and the cocoons are heated. The cocoons are generally sold to the factory, which assorts them according to quality, and reels the silk. The country weavers mostly purchase their raw silk of the reeling factory. In this condition large quantities are also exported. More than one-half of the raw silk exported goes to the United States.

Women are almost exclusively employed in all branches of the silk industry, and a large proportion of the work is done in the homes. A loom is found in almost every house, even the poorest. In such houses, always of one story, the dirt floor occupies about one-third of the space, and the matted platform two-thirds. The loom stands on one part of the ground floor, and the kitchen occupies the remainder The family lives and sleeps on the matted platform, which is usually about two feet above the ground.

The father and sons work in the garden and rice field. One of the daughters does the weaving, and the remainder assist their mother or work in the field. Weaving is done by the yard for some manufacturer who furnishes the silk. For lighter silk, used for linings or dresses, the price of weaving is 1½ to 2 cents per yard. A good weaver, working from 5 o'clock in the morning till 10 or 11 at night, usually earns 15 cents a day. Less skillful weavers earn only 10 cents a day. The cost of board in the home is about four cents a day. The price of provisions has doubled within the last two years; prior to that board cost about two cents a day.

Plain board for four cents consists of millet and barley, with boiled rice and a little dried fish and vegetables. Probably once a day they have bean soup and barley tea; milk and sugar are unknown luxuries.

They work seven days in a week, and appear to be perfectly contented. Wages do not appear to be uniform among silk manufacturers. At the Kirin Crape Weaving Company's, where one hundred girls and twenty men and boys are employed, girls receive seven and a half cents a day and board. They work from 5 A. M. till 8 P. M. Half an hour is allowed for the morning and evening meal each, and one hour at noon. Boys are taken for a period of three or four years to learn the trade. They are allowed for the first year board, two suits of clothing, and $1.25 for spending money. After the first year they get

an increase of spending money up to $4 for the year, and a small prize in case of extra good work. They work eleven hours daily. Everything is done by hand.

The Kirin Japanese Weaving Company has a complete outfit of modern machinery for all purposes. Considerable of the machinery is from the United States. It has 140 looms, and employs 450 girls and 250 men; no apprentices. Girls are paid five cents a day and board the first year; afterward wages are advanced according to skill, till they reach 10 cents a day. Men are paid from 15 to 25 cents a day, and board themselves. The power is furnished by a turbine wheel, American make, of 350 horse-power.

The silk industry in Japan is practically a home industry. There are a few large factories, but the weaving is done mainly in the homes. In 1895 weaving was done in 660,409 families in the empire; the whole number of weavers was 949,123; the total number of operatives engaged in the manufacture of silk was—men, 57,850; women, 985,016. The wage is so low, the margin of profit is so small, and the conditions of life are so limited and fixed in Japan that any causes which operate to depress the silk industry work a great hardship on the homes of the people.

Process of Mercerizing.

A German invention has made its appearance, which we illustrate, herewith, of a process for the treatment of fibres, or textile materials, for the purpose of improving their appearance, or finish, and for facilitating the operation of dyeing.

As is well known, the process of mercerizing yarn, or textile material, is to give it not only lustre, but the property of absorbing dyes, two well known characteristics that are imparted to fibres by the process of mercerization. According to the notion of the German inventor of this process, the use of caustic soda is objectionable, in that it absorbs, or combines with a quantity of the carbonic acid of the atmosphere, rendering it inoperative, and causing the production of irregular results in the dyeing.

After a series of experiments, he finds that if the material is treated with a solution containing sodium sulphide (Na_2S or potassium sulphide

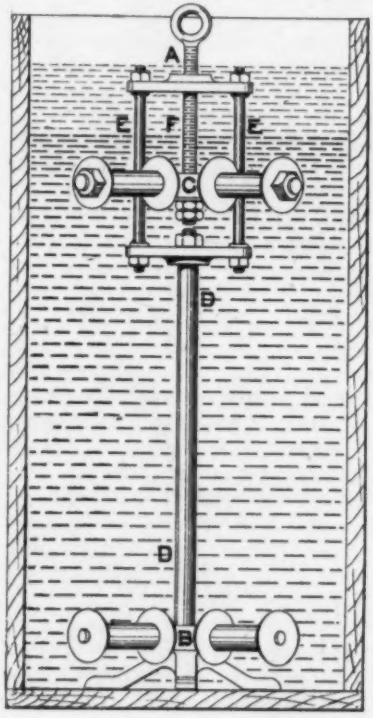


FIG. 1.

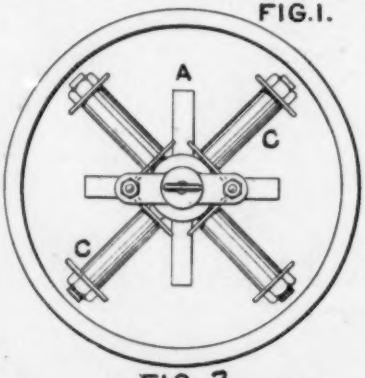


FIG. 2

(K_2S) in the proper proportions, with the addition to the solution of ethyl or methyl alcohol, sulphonated or ox-

idized oils, benzine, benzol, solvent naphtha or naphtha oil, turpentine, or petroleum, much better results are obtained, and that a permanent lustre is imparted to the fibre not otherwise obtainable. The material may be treated in the form of yarn or after it has been woven into a fabric.

The accompanying drawings illustrate the apparatus designed for treating the yarn in the hank. The inventor of this process prefers a bath, preferably cold, containing a solution of sodium or potassium sulphide (Na_2S or K_2S) in the proportion of about thirty per centum, though it may be made stronger or weaker, as may be found desirable, according to quality or degree of fineness of the fibre to be treated therewith. To this solution is added about ten per cent. of one of the following solvents: benzine, sulphonated or oxidized oils (olein, turkey-red oil, or the like), benzol, ethyl or methyl alcohol, naphtha, turpentine, or petroleum. In the bath when thus prepared the solvent remains on top and the yarn or fabric passing through is first impregnated therewith and the fat or gum dissolved before entering the alkaline solution. The yarn or material to be treated is immersed in this bath until completely saturated—say from fifteen to thirty minutes—and then withdrawn. During the process of immersion or immediately after, the yarn or material is subjected to the mechanical operation of stretching to prevent the shrinkage that would otherwise take place.

For yarn in the hank there is employed the apparatus or frame A shown in the drawings, upon which the yarn is first placed upon the arms B and C. The lower arms B are mounted upon a pillow D, and the upper arms C are carried by the stays E and screw F, by which latter they can be adjusted and drawn away from the lower arms B to give the desired amount of stretching to the fabric.

The use of the solvents before entering the strong solution is of very great importance, as their use greatly facilitates the absorption by the material of the alkaline medium, and shortens the process, and it also renders the treatment of the material completely uniform, so that it can afterward be dyed of an even or level shade throughout. This is of the utmost importance in dealing with light shades or colors. The solvent may be used separately and may be poured over the material, or it may first be immersed therein.

When removed from the bath, the yarn or material is immersed in another bath of water or otherwise thoroughly washed to remove all traces of the alkaline solution.

This process renders the fibres bright, lustrous, and glossy in appearance, almost like silk.

Acetylene.

The Boston Manufacturers' Mutual Fire Insurance Co., in its last October report, cautioned its members not to adopt new methods of lighting, especially with acetylene gas, lest a new element of hazard should be introduced into the risk, without the consent of the underwriters, which is required by the contracts. In response to many inquiries for further information concerning calcium carbide and acetylene, an additional report has been made, which is characterized as preliminary, concerning this subject. According to preliminary investigations it is stated that with the present state of the art and the existing prices of carbide, it is believed that any mill putting in an extensive acetylene plant is, to a considerable extent, entering unexplored territory. While a great deal of experimenting has been done in this line, there is yet much to learn before a surely satis factory lighting system is secured.

Most any system at present available requires considerable care and attention in handling the generator. The flame tends, from the great richness of the gas, to become smoky if the burners are not in perfect order. Computations on the present prices of carbide, and with steam and water

power at the cost existing in many mutual mills, indicate that it is very doubtful if acetylene is at all a cheap illuminant.

Waiving for the instant the question of expediency and considering the dangers in acetylene, the following general properties of the gas may be considered. The figures given are based upon best evidence so far attainable and are believed reliable. There are many conflicting statements abroad.

Mixtures of acetylene and air, where the acetylene is from 6% to 25% of the mixture, are explosive, and there is some good evidence that the range may be as great as from 5% to 50%.

Comparing this with illuminating gas, mixtures of illuminating gas and air are explosive over a range of from 7% to 18% of gas, showing that the range of explosive mixtures of acetylene is much wider than for ordinary gas.

Explosions of mixtures of acetylene and air are more violent than mixtures of ordinary gas and air.

The weight of acetylene gas, taking air as 1, is about 0.90, showing that acetylene gas tends to rise, so that in this respect it is better than naphtha gases, which are heavier than air.

Acetylene gas under some conditions may form acetylides, i. e., compounds with metals, which are in themselves pure explosives. The best evidence available would seem to indicate that the principal danger was where pure copper is exposed to acetylene; even then, however, the presence of moisture and possibly some impurities in the gas is probably necessary for the formation of acetylides.

Other metals commonly used apparently are not subject to this danger, and there is considerable evidence to support the feeling that the ordinary small composition fittings used in a gas plant are not dangerous, though any considerable amounts of copper or copper alloys in piping or machinery or in the shape of large fittings, best be avoided.

If, after considering the above conditions, there is still a desire, in any case, to permit an acetylene plant, the following general requirements, it is believed, should be carefully fol lowed:—

1. The generator should be outside the main buildings and thoroughly cut off from them, preferably in a small building by itself fifty feet, if possible, from important buildings. As a whole it should be treated about like the ordinary naphtha gas machines.

The dangers from possible escape of gas in handling the machine, or in repairing it, or by possible ignorance of an attendant, or by accident, and the very considerable dangers introduced if carbide itself is brought into the building, make it appear entirely improper to place one of these machines in a first-class risk.

2. The carbide should be stored entirely outside important buildings, but might be in a compartment of the generator house. It should be looked at about like the main naphtha storage tank of a naphtha gas plant.

3. Before a plant is put in, the complete plans should be submitted to the underwriters for approval, as there is no standard of construction of machine which can be approved in a general way. There are a number of important features in any machine supplying acetylene gas needing attention, such as certain limit of pressure, constancy of action, so that there is no chance of the production of gas being stopped and then started again after the burners have gone out, allowing the gas to escape through the open burners. Action such that excessive heating, which tends to bring impurities into the gas, which might make trouble in the building, and other similar points, need careful consideration.

—The more knowledge of and sympathy with the tastes of the purchasing community a maker possesses, the better is he equipped for gauging its requirements.

Reels.

MANUFACTURED BY THE DRAPER CO., HOPEDALE, MASS.

The merits of the reels made by the Draper Company, Hopedale, Mass., are deserving of illustration and description, which we take pleasure at this time to give. The illustrations show both the front and rear of these reels. These machines are not built for the profit there is in them, and there are no patented features to attract by their novelty. They are simply built for the class of customers who desire to preserve a harmony in their mill equipment by using a superior machine. These reels are constructed from entirely new designs, with a relative position of their different parts, so arranged as to operate easily. The traverse motion is geared, and, therefore, positive, making it impossible to wind other than a well wound skein; consequently, the process of spooling, or other succeeding operation can be more rapid and less wasteful. The bearing on driven end is set in a ball and socket joint, so it cannot be strained in lifting the swift for removing yarn. The bearing on the opposite end is entirely protected, preventing any oiling of skeins.

The releasing arms and traverse are furnished with metal bearings, fitted in metal boxes.

The shaft is of wood, insuring lightness, and for the purpose superior to any other material.

The bobbin box has waste box at each end, and is protected from any drip from spindles.

These machines are fitted with either Sawyer, Rabbeth or common spindles, each spindle removable independently of others. Spindle bearings have hinged protecting board, preventing dirt and flyings from lodging.

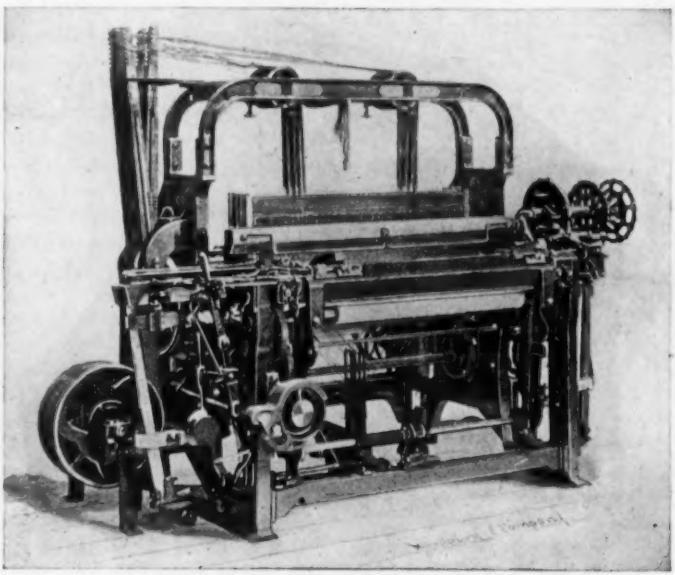
A gong is attached to strike at the completion of each hank of 840 yards, or when any other length desired has been reeled. It is recommended that the maximum length of reel shall not exceed 65 spindles, with 2¼ inch space, length over all 15 feet 3¾ inches; total width for 54-inch skein, 2 feet 9 inches.

—How is it feasible to command the taste of a people of whose national and indigenous feeling for color and ornament we have no accurate information?

—When rove yarn is used for warp, it should be very well sized, because any softness beyond a certain point will allow the threads to be so chafed when weaving that they will draw out in a similar way to a yarn with soft twisted places.

A Loom with Improvements.

It would be a strange condition of things in textile manufacturing if the Draper Company, Hopedale, Mass., should stop thinking, or getting out improvements for greater mechanical efficiency in the production of goods. We give, herewith, an illustration of a loom with certain improvements that are readily seen, showing the progress of loom development made by this company. As will be seen, this loom is rather more elaborate than those of this company's usual make. This machine was especially designed for corduroys, and runs eight harnesses from a side cam motion. The take-up is positive, being geared directly from the lower shaft. The filling changing device, which is one of the important features of the Northrop loom, is attached to this loom. The illustration of this machine is self explanatory.



DRAPER CO.'S LOOM.

Philadelphia Textile School.

COMMENCEMENT EXERCISES.

The Philadelphia Textile School of the Pennsylvania Museum and School of Industrial Art, held its annual commencement exercises on Thursday evening, June 8th. Thirty-nine students in various departments received certificates for having successfully completed their courses of study, and seven graduates were awarded diplomas. The exhibition of the year's work as accomplished by the students, fully demonstrates the increasing capabilities of the school. The high standard of excellence does much to show the rapid strides of progress which this institution is making towards becoming the leading technical school in America as far as the industrial sciences and arts are involved.

The work done this year in competition for the medal which the Textile World offers for the best results attained in dyeing has set a standard which will be difficult for any student to over-reach. Wilfred Senior, the successful competitor for this prize, has shown what an American technical school can do for an American student and we do not believe that as high a standard has ever been attained before even in the celebrated technical schools of Europe. For thoroughness

of manipulative detail and originality in ideas and experiments, the work of Mr. Senior exhibits in a characteristic manner the influence of a scientific training upon the makeup of a technical student, and the Philadelphia Textile School is to be congratulated for the successful manner in which it imparts to its students the essentials of this scientific training. Mr. Senior is to be complimented for showing the possibilities to which such a training may be applied.

A school is to be judged by the students it turns out as its product to the world, and it is through the attainments reached by its students that it will acquire recognition. The time is fast approaching when technical schools will form an important factor in the educational system of America; the progressive demands of the industrial arts and sciences are calling for the highest development of skill in both mind and hand, and the scientific training imparted by means of a thorough technical education is the sole thing which will allow such a development to be possible. We must learn the lesson taught so well by Germany and other countries, that education must form the basis of all industrial progress. The so-called "professions" have long recognized this truth, and they require of their members a thorough technical training in their chosen line of work.

The old era of the "apprenticeship" system has drawn to a close, and the workman of today who wishes to rise above a certain level in the industrial life of the world, must turn to the technical school to acquire both the broad educational basis from which to start and the creative inspiration by means of which he alone can rise. The industrial wage earner of the coming day who is not furnished with an adequate technical education will never rise above the rank and file of his fellow-workers, and the captains of our industries will be those who have benefited by the opportunities which such an education affords. Education is no longer a luxury, it is a necessity, and a necessity which must be provided for in order that development may be possible.

The Philadelphia Textile School has done pioneer work in carrying out this educational idea in its application to industrial pursuits. Located in the busy centre of the textile world, it is making its influence felt in every department with which it deals. Its students are recognized and received as efficient and well trained men in all branches of the textile profession. The sphere of its usefulness is a large and comprehensive one, and is ever increasing in its proportions; and this increase must be met with increased resources in order that no void be left unfilled. Recognizing the fact that chemistry is the fundamental science of all the technical arts and believing that the study of such a subject furnishes the best means of acquiring a scientific training, it has been the policy of the school during the past year to give especial attention to the development of its chemical department. In furtherance of this, courses have been introduced into the curriculum of the school which exhibit a movement towards higher educational ideas.

After all is said and done, it is not so much the amount of knowledge which a school imparts to its students that forms its greatest influence, as it is the training which it gives to the character of the student that comprises its real influence; and it is the aim of this school to round off the crudities and the rude outlines of mill practice with the refinements of a scientific training. In any technical education the practical knowledge and methods of manipulation, of course, should be the foremost consideration, but the creative spirit should be engendered by a close attention to the acquisition of scientific ideas and methods.

In the development of its department of chemistry and dyeing the Philadelphia Textile School has recognized the necessity of a scientific

background for all of its industrial teachings, and an attempt is being made to establish this department as a school of technical chemistry, having for its field the applications of chemistry to the textile and allied trades. In thus extending its scope the Philadelphia Textile School is endeavoring to meet the rapidly increasing demands for men scientifically trained in these professions, and this movement is entitled to receive the recognition and the heartiest co-operation of all who are interested in the promotion and the welfare of these industries. The Philadelphia Textile School is inspired with motives which should appeal to the appreciation and secure the material support of every manufacturer who is at all interested in the development of his profession.

The United States Finishing Company.

The United States Finishing Company, organized with an authorized capital stock of $2,000,000 7 per cent. cumulative preferred and $1,000,000 common, of which $650,000 has been or will be issued, leaving $100,000 preferred and $250,000 common in the treasury. Besides this there will be an issue of $1,750,000 1st mortgage 20-year 5 per cent. sinking fund gold bonds. This company acquires by purchase of stock, and owns and controls the Norwich Bleaching, Dyeing and Printing Company of Norwich, Ct.; the Dunnell Manufacturing Company of Pawtucket, R. I., and the Reid & Barry Company of Passaic, N. J., printers and finishers of fine cotton fabrics. The officers of the company are: President, William Wanton Dunnell; vice-president, Hugh H. Osgood; treasurer, J. Hunt Smith; secretary, J. Millar Wilson; general manager, Joseph H. Wright; directors, Peter Reid, president Reid & Barry Company, Passaic, N. J.; Hugh H. Osgood, president Norwich Bleaching, Dyeing and Printing Company, Norwich, Ct.; Frederick C. Sayles, Providence, R. I.; Andrew G. Pierce, New Bedford, Mass.; Joseph H. Wright, treasurer Reid & Barry Company, Passaic, N. J.; J. Hunt Smith, treasurer Norwich Bleaching, Dyeing and Printing Company, Norwich, Ct.; William Wanton Dunnell, treasurer Dunnell Manufacturing Company, Providence, R. I.; J. Millar Wilson, superintendent Norwich Bleaching, Dyeing and Printing Company, Norwich, Ct.

The combined companies have had an annual output of about 180,000,000 yards, and have had average net earnings for five years of $346,587, enough to pay interest on the new bonds and 7 per cent. on the outstanding preferred stock, with $126,087 to spare. The business was taken over as of July 1. The bonds may be retired by lot after 10 years at 104 and interest. A sinking fund of $50,000 a year will be taken from net earnings after two years. The preferred stock is preferred as to assets as well as dividends. Par of the stock is $100. Fifteen hundred thousand dollars of the bonds and $500,000 preferred stock have been offered to shareholders of the constituent companies, who are reported taking them freely. Any unsold balance will be offered to the public later in Boston, New York, Providence, Norwich and New Bedford. W. O. Gay & Co. of Boston are fiscal agents for the combination. The Produce Exchange Company of New York is transfer agent, the State Trust Company of New York registrar, and the Old Colony Trust Company of Boston is trustee. The capital stock of the old companies is: Norwich, $500,000; Reid & Barry, $1,000,000; Dunnell, $600,000; total, $2,100,000. The Norwich company has paid no less than 10 per cent. dividends for 30 years. Reid & Barry have paid nothing to 20 per cent. The Dunnell has paid 6 to 8. The Norwich company has some $200,000 notes payable. The others have had practically no debt for several years. Neither of the companies has any outstanding bonds, so that the old capitalization is practically $2,100,000 stock, and the new $1,750,000 bonds and $3,000,000 stock in two classes, a total capitalization of

$4,750,000. It is said of the properties that they are worth very much more than the old capital stock. The new company is to have a working capital of rising $700,000, and will start with a good business in hand.

The Yarn Trust.

Judging from the reports from Fall River, there is much anticipated dissatisfaction among the stockholders of at least two of the principal yarn mills in that city, in regard to the yarn mill combination, which is now under way. The Fall River News is the authority for the statement that the stockholders of the Globe Yarn Mills and of the Sanford Spinning Co., are not becoming more pleased as the scheme for the combination of the yarn mills is developed. The first impression given was that a syndicate with an abundance of English capital proposed to buy out the yarn mills. Prices for stock were arbitrarily fixed, and while stockholders were not actually threatened, the promoters of the scheme made no effort to check an impression that individual stockholders and corporations alike that did not enter the deal would very probably be crowded to the wall and crushed. Under the influence of that impression the stockholders for the most part went into the deal. They were given a very limited period in which to make up their minds. Those who did not make up their minds in that period were, however, allowed the privilege of coming in late on equal terms with those who were early in getting inside.

Having successfully engineered the first and most important step, that of binding the stockholders, the promoters have unfolded a scheme in sections. With each move the stockholders were hurried along by a limit of time for decision. Having taken the first step, there has seemed to be nothing gained by holding back. The English syndicate feature of the deal has been pushed into the background, while New Bedford has come to the front as the head and centre of the deal. Some English capital may be employed, but it does not seem likely that there will be much or anything English in the management and control of the combination.

Many stockholders in the two local corporations are strongly of the opinion now that the Globe Yarn Mills and Sanford Spinning Co. could have stayed outside and gone on independently with little danger of molestation by the other mills. The two Fall River concerns were apparently needed to help the New Bedford scheme out, and they were secured very easily. Sanford Spinning Co. stock, in particular, went at a ridiculously low price as compared to prices allowed for other stocks.

All the preliminary talk was for cash payment for the stock. Only after the agreements to give options were in were the stockholders informed that they would have the "privilege" of subscribing to stock in a new company, and advised to do so. As an incentive to them to subscribe at once a rebate of 5 per cent. is allowed. The stockholders are not given the choice of taking bonds or stock but are offered only the preferred stock. It will be difficult to convince many of them that they are not selling their old stocks at certain prices to buy them back at much higher prices, since a share of the new stock will represent a considerably less proportion of the whole capital represented by stocks and bonds than a share of the existing stock does of the existing capitals.

—The whole art of commercial success in designing consists in producing what is fitting, or, in other words, those textures and styles of pattern for which the buyer has naturally and by education and local influences an appreciative faculty.

—The attempt to revive lustre and glace fabrics in dress materials is likely to result in the production of small figured styles.

United States Worsted Company.

The United States Worsted Company, which has been in process of organization for several months, will be capitalized at $36,000,000, of which $16,000,000 will be preferred and $20,000,000 common, provided the project goes through. The stock will be underwritten by Baring, Magoun & Co., of New York, and Kidder, Peabody & Co., of Boston.

Attorneys for the company are now examining titles of the various mills on which options have been obtained.

Carpet Trust a Failure.

The predictions made some weeks ago when the project for a consolidation of carpet mills was first broached, that the deal was not likely to be carried out, seem to have been confirmed, as it is now stated that the options have expired and the negotiations dropped, at least for the present. The deal did not have the brightest prospects at any time, and the present condition of the industrial securities market, with the attendant difficulty of securing financial support, is understood to have defeated the project.

American Mercerizing Company.

It is announced that the American Mercerizing Company, recently incorporated in New Jersey with $350,000 capital, intends to do a general business of mercerizing yarns, threads, etc., and that the incorporation is only a preliminary step toward securing what those interested claim to be their rights under the Thomas and Provost patents, which they control in this country.

It is said to be the intention of the American Mercerizing Company to enforce their supposed rights and compel if possible, those using the process to pay royalties to the syndicate. Already notices to this effect have been served on the mills doing a mercerizing business, and some have agreed to pay the necessary royalties, while others have denied the right of the syndicate to assess royalties and will contest the matter on the ground that the process of mercerizing is an open one and not susceptible to patents, except where specific machines covered by patents are used.

The idea of controlling, if possible, the process of mercerizing in this country originated with the American Thread Company, who recognized the extensive use to which the process could be put in the production of varied and valuable descriptions of fabrics. The company approached others of the large mercerizers, with the result that four mercerizers and one builder of textile and mercerizing machinery organized the American Mercerizing Company, including among others the American Thread Company, the Aberfoyle Manufacturing Company and the Galey & Lord Manufacturing Company, of Chester, Pa. Several weeks ago Director Kerr, of the American Thread Company went to England, it is understood, for the purpose of furthering the interests of the mercerizing company, and on his return, in about two weeks, the permanent organization will be completed, together with the election of officers. While no slate of officials has been named, it is stated that W. T. Galey, of the Aberfoyle Manufacturing Company, Chester, will be the president. The attorneys for the syndicate are J. Murray Mitchell and John R. Dos Passos, of this city.

—In the method the German pursues in establishing a new market there is ample evidence of ready willingness to adapt his natural and trained ideas to such models as have become standards in the country to which German manufactures are to be exported.

—The chief imports from America to China now are, and will probably continue to be, drills and kerosene oil, while in the future there will probably be a large opening for American clocks and machinery.

COTTON DEPARTMENT.

Leno Jacquards.

As stated in last article a leno jac quard that has the harness tied up on the American principle has the pattern cards over the side of the loom, and not over the front as is the case with a leno jacquard tied up on the English system. Now, if as in the English system the harness is tied up straight, or as it is also called, the Norwich tie, with the cards over the front of the loom, then, in the American system to have the cards over the side of the loom, a quarter turn of the jacquard is necessary, thereby causing a quarter twist of the harness. This is called the cross, or London, tie. Now in the latter system the harness is divided into three parts: Back eight rows of hooks and needles for the easers, thirty-two rows for ground or figuring harness, and the front eight rows for the doup standards, this being for a 384-hook jacquard with a figuring capacity of 256 threads. By referring to sketch, Fig. 1, it will be seen how the harness is divided.

In back comber board through which the easing harnesses pass there are two holes in a row. In comber board B there are eight holes in a row and in comber board marked A there are two holes same as in back comber board. The harness from the first hook is taken through the first hole in front comber board, from the second hook through second hole in comber board and so on until the eight rows or the 64 harness are through the board. The harness from the 65th hook is taken through the hole marked 65 and the harness from the 66th hook is through hole marked 66 and so on until the harness from the 320th hook is through the hole marked 320. Then begins the 321st, which is simply a repeat of the first part until the whole number are through the board. This number is only for one repeat of the pattern, so that if there were, say, six repeats of the pattern there would be six harness tied to each hook in the jacquard.

Now as already stated, the easing harnesses are worked just the same as the doup standard harnesses are worked, therefore the reason will be seen why eight rows are required on each side of the figuring harness—16 rows or 128 harnesses for doup and easers, 32 rows or 256 harnesses for figuring. There are just as many harnesses again for the figuring as there are for the doup standards and the easers combined.

We must understand that the jacquard under consideration has two threads crossing two.

The greatest difficulty which some experience is that they cannot comprehend how the threads are drawn through the harness. A short explanation may therefore not be out of place. On the back or easing harness the mail has a double eye as shown at Fig. 2, through which two of the threads are drawn. These two threads are again drawn through the figuring harness and also through the doups. To be more clear. There is and must of necessity be one-half of the warp threads that does not pass through the mails of the back or easing harness, for it is only those threads that have to cross and recross to form the gauze that are drawn through the easing harness and through the doups. Take the diagram as given, the first two threads would be drawn straight from the warp into the first two of the figuring harnesses marked 65 and 66 and then would pass over the doup. The third and fourth threads would be drawn through the first easing harness marked 365, one thread through each eye in the mail and then through the figuring harness and through the doup. It is absolutely necessary that the threads be

kept perfectly straight as regards their order, or otherwise an imperfect piece of cloth will result from various causes. For instance, on examination of the front and back comber boards A and C it will be seen that each is the exact counterpart of the other, and as already stated each corresponding harness has to work exactly the same as regards the formation of the gauze. Now, knowing that the threads which are drawn through the easer harness marked 321 are also drawn through the ground or figure harness 67 and 68, and also through the doup of number one harness. If by mistake the threads were drawn through the doup of number two harness then those threads would not

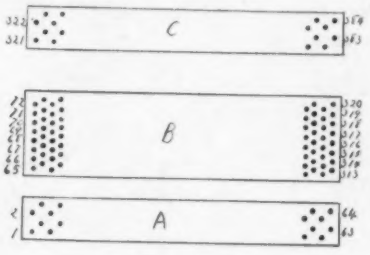


Fig 1

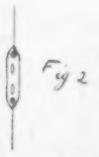


Fig 2

weave the design as it ought to be, for were the second doup weaving gauze and on the last threads of a gauze pattern, and the first doup weaving plain, we can readily see what would be the effect, for where the second doup standard harness would be raised to form the cross shed, the gauze would be in its wrong position in regard to the pattern; for instead of the first doup standard being taken for the first two threads the second doup standard would be taken.

Not only this, but as we know that whenever a doup standard is raised the easer harness has to be raised also, so as to allow the threads to be raised to form the cross shed without any undue strain or friction being put upon the ground threads or those threads which cross over the doup. In the case cited it will be seen that when the easer is raised for the second harness, the second harness will also be raised, but instead of having its right threads through it and raising them, the threads that ought to be through the first harness are being raised, thereby causing wear and tear on the doup, from the fact that the first easer harness has not been raised, thereby keeping the threads tight; for as will be seen it is the second easer harness that has been raised, and unless the yarn is exceptionally strong they are apt to be broken owing to the crossing and recrossing of the doup harness threads. This has been cited as an example, and we can readily see what effect it would have upon the cloth if there were many threads drawn through wrong, hence the necessity of carefulness on the part of the weaver, and the constant watchfulness of the person whose duty it is to see that good cloth is being turned out.

Constant and untiring effort is required very often before the weaver obtains that experience which is so essential in the making of good, first-class leno jacquard cloth. The overseer of such a room must of necessity be one that is thoroughly posted in every detail, and must himself be a practical weaver and fixer and understand the working of the different parts of the machinery, if the room has to be run successfully.

THOMAS.

—A large rope and cordage factory has been erected in the city of Merida, State of Yucatan, Mexico, and is now in full operation, having, it is said, large orders for binder twine from firms in the United States. It is the first and only plant of the kind in the entire Republic, and is, experts say, one of the best equipped plants of its class in the world.

Principles of Cotton Spinning.

ROBERT CUNLEFFE.

The draw frame next demands our attention, being the next machine used in the process of cotton spinning, whether it be combed or carded yarn. For carded yarn the sliver from the carding engine is taken through two, three, or four heads or boxes of drawing, according to the quality of cotton being worked, and then on to the other machines, but in combed yarn, the sliver from the card is taken through one head or box of draw frame rollers, then made into a lap for the combing machine. After the comber, then through three or four heads of draw frames before passing on to the other machines.

The object of the draw frame, is to more perfectly parallelize the fibres, and to equalize the sliver from the card, preparatory to putting in the twist. If we examine the sliver from the card, we shall find that the parallel arrangement of the fibres is very imperfect, and must be improved, and also, if we weigh the sliver, yard by yard, we shall find a very considerable difference in weight, which if passed on in that condition would result in very great irregularities in the yarn. The attainment of the first (the parallelizing of the fibre) is accomplished by passing the sliver between four pairs of drawing rollers, each succeeding pair running quicker than the preceding pair. The principle of the drawing operation to which the sliver is subjected in passing through these rollers, is exactly similar to the method we employ in determining the relative lengths of the fibres of different varieties of cotton. In this case we take up a sample, and by merely drawing apart its fibres several times between the forefinger and thumb of each hand alternately, we succeed in laying them in a straight and parallel direction. Now this is simply what is accomplished by the draw frame rollers, running at different speeds, it must necessarily straighten the fibres, and elongate the web.

This difference in speed between one roller and another, is spoken of as draft. And the rule in the draw frame, is to have the amount of draft equal to the number of doublings. That is, if you double six slivers into one, to have six of a draft, which means that the surface speed of the front roller shall be six times greater than the surface speed of the back roller. In that case the resultant sliver coming from the front roller would be equal in weight, yard by yard, to the individual sliver put at the back pair of rollers.

But quite as important, at least, is the draft between the rollers themselves. A good draft would be, from the fourth or back pair to the third, a draft of 1.2; from the third to the second, a draft of 1.5; from the second to the first, or front roller a draft of 3.33, which would give $1.2 \times 1.5 \times 3.33 = 5.994$, or practically six of a draft.

We thus see that at the commencement when the sliver is heaviest and the fibres in their worst condition, a very small draft of only 1 in 5. This prepares the fibres for a greater draft in the next pair, where we get 1 in 2. Having now drawn the fibres out each inch or yard into 1.80 inches or yards, they are in a much better condition for yielding to a much greater draft, so we get in the next pair of rollers 3.33 inches from every inch.

We wish these drafts to be clearly understood as they are very important so we will put them in another way. Between the back or fourth pair of rollers and the third, we only gain one inch out of every five inches going in at the back; between the third and the second pair we gain one inch out of every two inches; but in the second and first or front rollers, we gain over 3¼ inches from every inch. This is a much greater draft than the other two put together, which the sliver could not stand, were it not for the preparation of the two previous drafts.

If the operation of the draw frame rollers upon the fibres were carefully

noted, it would be seen that something like the following operation was taking place. Let it be noted that the two ends of the fibres must never be under the two sets of rollers at the same time. The fibres are fed in the back pair of rollers; the front ends of the fibres are free; whilst the back are held by the rollers; but the front end of the fibres are embedded in the bulk of the surrounding fibres, and by them drawn forwards, thus drawing the front or loose ends into a parallel condition, whilst the back part of the fibres are held.

Then for a very short space, both ends are at liberty from the direct action of the rollers; still the front ends of the fibres are under the influence of the fibres under the quicker, and the back ends under the influence of the fibres under the slower rollers. Then the front end of the fibres are laid hold of by the rollers running at a greater speed, whilst the back part is free from the rollers, yet held back by the surrounding fibres, and by this means the fibres are laid parallel one to the other, very similar to the method referred to above, that of drawing out a sample by hand.

We think if our readers have followed us in this explanation, the operation of the parallelization of the cotton fibres by the draw frame will be more clearly understood.

We now come to consider the other object of a draw frame, viz., the equalization of the sliver. The necessity for this arises from the fact, that notwithstanding the regulators on the scutching and the hopper feed machines, the lap placed behind the carding engine, although much more regular in weight, yard by yard, than was the case a few years ago, leaves much to be desired in this respect. Again, though these irregularities passing through the card, are not improved, but, rather, to some extent intensified, the fact remains that the sliver shows irregularities of such a character that no one in his sane moments would advocate its being passed forward under these conditions. It is related that Sir Richard Arkwright who was the inventor of the draw frame, whenever anything went wrong, in the shape of uneven work, would say to his carder, "look to your draw frames."

Having dealt with the principles of the draw frame as to equalizing and parallelizing the fibres, we come now to say a word or two about the rollers themselves. First, covering; second, setting proper distance one from another; third, weighting.

The covering of the draw frame top rollers is a very important matter. At the present time attempts are being made to run the three back lines of the top rollers uncovered, and fluted like the bottom rollers, the two rollers working flute and flute, like a pair of toothed wheels. There is no doubt, with the latest improvements made in these rollers, whereby the collars on the ends bear the weight of the rollers, and the depth of the flutes regulated, instead of the whole weight resting upon the flutes, as was previously the case, a stride in the right direction has been made. For a heavy sliver and coarse, short stapled cotton they will do very well, but for the finer fibres, leather covered rollers are still preferable. The rollers should be first covered with roller cloth, about 10 oz. to the yard, and then covered with good leather, either sheep or goat skin. Great care must be taken to see that the piecings are properly made and no thicker than any other part of the roller.

Even with the greatest care in the length of a draw frame roller, uneven places will be found. If these are allowed to pass, cloudy and uneven drawing will be the result. To avoid this, the leather should be skimmed after being put on, to make the roller perfectly uniform in diameter from one end to the other. Of course, after being skimmed, it will be necessary to varnish the rollers. A varnish with a good body in it should be got for the purpose.

In passing let me suggest a very simple yet very efficient method of

testing all rollers, as to whether they are uniform in diameter or not. On a perfectly smooth and level plate, a little broader than the length of the roller, placed at an angle of say 45°, place a roller squarely on the top and allow it to roll down. If the roller be uniform in diameter it will go straight to the bottom, but if one part be larger in diameter than another it will go off on one side.

We now come to the second part, the setting of the rollers the proper distance one from another. This, all will admit, is a very important matter. Let us preface by saying that to get the proper distance is to measure from the centre of one to the centre of the other, and not the space between them. A less space may mean a greater distance, that depending upon the diameter of the rollers.

Some authorities give the following rule, which is very misleading: Set the rollers 1/16 of an inch farther apart than the length of the fibre being worked. Of course, it is very important that the centre of one to the centre of the other should never be less, but quite 1/16 more than the length of the fibre being worked, but there are other considerations quite as important.

The distance of rollers depends upon four conditions: First, length of fibre being worked; second, thickness of substance to be operated on; third, amount of twist in roving; fourth, amount of draft. If the substance be great, it requires a greater distance; if extra quantity of twist in roving, a greater distance; whilst slackly twisted requires a shorter distance. A very small draft a greater distance, a very large draft a shorter distance. Thus we see there are other considerations besides the length of staple. If that were the only thing to be considered, then the three lines of rollers would be equal distances one from the other, but we are all aware that in every machine the two back lines are always farther apart than the two front ones, and this arises from the fact that a heavier substance and less draft are in the back lines of rollers.

If there be any connection between draft and speed, in draw frames, it ought to be in an inverse ratio. That is, if you have a big draft you ought to run slow, but if your draft is low, you may run a good speed with safety. There is nothing like a quick speed and a long draft for making plenty of flat waste, and other waste as well, because nothing tends to break the fibre so much as quick speeds and big drafts.

We now come to consider the third part, that of weighting the rollers. There are lever and dead weights. By far the greater majority of managers are in favor of dead weights. But there is one thing in favor of lever weights, that is, you can readily alter the weight on the roller, putting more or less on at will. But this facility often becomes a serious evil, through the carelessness or ignorance of the tenter, in putting the weight on the wrong part of the lever, or, not adjusting the lever properly on the fulcrum. Dead weights cannot be tampered with, but they are more troublesome and expensive, if it be required to alter from a lighter to a heavier weight of sliver, or vice versa. It frequently happens that the draw frame sliver seems uneven, cut, or lumpy, notwithstanding that great care has been exercised in setting the rollers a proper distance apart to suit the staple of cotton being worked. As cotton is apt to vary from different mixings, it is difficult to hit upon the right thing in distance one from another of the four rows of rollers, when all the top rollers are heavily weighted. Clouded drawings are not only produced from heavily weighted rollers being set at improper distances to suit the length of staple of the cotton, but from long and short stapled cotton being mixed together, which is sometimes desirable to do on account of their relative cheapness in the cotton market. The best remedy for clouded drawing is to take the weight

off the middle roller.

A good plan to measure the exact distance of one roller to another is to get a piece of soft, smooth wood, place it on the bottom or fluted roller, and with a slight blow the flutes will show on the wood, when the exact distance can be measured.

Reference has been made to varnishing the rollers. We think it will be useful to our readers if we should give one or two recipes for good roller varnish.

First: 4 oz. black lead, 8 oz. fish glue, 4 oz. lemon chrome, 4 oz. Brunswick green, about 1 gill wood naphtha, more or less, according to the thickness you desire your varnish.

Another: One pint cider vinegar, fish glue about the size of a goose egg, a half cake of French glue, and enough frozen glue to make it stick to your finger and thumb as you rub them together, using venetian red for coloring.

Another: A good varnish for rollers is made by putting in a stew mug scraps of roller leather, till the mug is about half full (in a loose state), then fill up with water and cover the mug with a plate to keep the steam in, let it simmer, or stew, for about 24 hours, or until the leather is dissolved. When cold it may be laid on with a soft brush or otherwise. This would easily dry in about half an hour.

Another: 1 gill of best vinegar, 1 pennyworth of best fish glue, 1 pennyworth best gum, and 1 pennyworth white wood naphtha; the first three to be boiled till the gum and glue are melted, then add the latter when cold.

Every carder or manager likes to have his own varnish. We think that by trying these recipes he will find one which will suit him, whatever kind of work he may have in, and when he has found the best he may then add to his income by selling it to others. We know a number of people who are making a good income by selling varnish from the above recipes.

One word of caution may not be out of place here. Do not put varnish on too thick, otherwise in time it will begin to peel off. Then, if these rollers are varnished again, and perhaps again and again, they will become uneven in diameter. Where you have several layers of varnish in one place and hardly any at all in another, then these rollers will be worse than if they had never been skimmed.

Answers to Questions Set by the City Guild of London, 1898.

Question: What is the advantage derived from breaking up cotton as it is received in the bale and letting it remain in the stack for some time? How far does this aid in the subsequent operation of opening?

Answer: In making up the bales of cotton at the compress they are subjected to an enormous amount of pressure, in order to get a great quantity of cotton in a small compass. They are kept in this condition sometimes months before being liberated. When the iron hoops surrounding the bale are taken off, the cotton, if it has been packed dry, will swell out to almost double its size as it was before the hoops were taken off; but if the cotton has been packed damp it will swell very little indeed. But in any condition the fibres are sure to be matted together more or less, and will be taken from the bale in great lumps. These lumps want reducing to much smaller pieces. This is done mostly now by machinery. In most mills a bale breaker or cotton puller is used. This breaks these large lumps into smaller ones, besides extracting any foreign matter which might have got mixed in the cotton, such as nails, stones, etc., etc. This breaking up of the large lumps into smaller pieces is good both for mixing and for the opening machine. For mixing, because the different lots of cotton can be mixed more effectively in smaller proportions, and the opening machine can do its work much better and without the same danger to strike fire, the hard substances having been removed. Yet, notwithstanding these advantages, many of our finest mills

refuse to use the bale breaker or cotton puller and prefer to pull these hard and large lumps into smaller pieces by hand. But there is also another advantage derived in making a stack and letting it remain some time before being used. One, often overlooked, yet in the opinion of the writer of great importance, is that the fibres having been doubled up and pressed together and kept in that condition a considerable length of time, require to be opened out and left in a loose condition to enable the fibres to get back to the natural state they were in before being pressed together, so that in passing through the machinery they may get to their full length and not go through doubled up together.

Question: Describe the modern mixing room; name the machines used.

Answer: In connection with this question the same answer will not apply to all mills, different methods being adopted at different places. In most modern mills the bale room is placed over the mixing room, in which case the hoist and scales are placed in the bale room, not in the mixing room.

There are many large mills, especially in the Bolton district, England, with which the writer is very well acquainted, where there are no machines at all in the mixing room. In this case the cotton is put down holes in the floor of the bale room, the cotton falling at the place where the mixing is intended to be. The mixing is made by a number of men and women spreading it equally over the space intended to be taken up by it. In taking down the mixing, the cotton is put in large skiffs on wheels, which are run to the place where holes are made in the floor for the cotton to be put through, falling near to the feed part of the hopper or opener in the scutching room. But no doubt the greater number of mills, especially on medium and coarse work, have in the mixing room the bale breaker or cotton puller and traversing lattices. In this case the cotton will be taken from the bales and deposited on the lattice of the cotton puller, passing through four pairs of coarsely fluted or spiked rollers, each pair running quicker than the preceding pair. The cotton is deposited on another lattice, which may at once drop it at the place where the mixing is to be, or it may be deposited on another lattice running transversely to the other to feed another mixing at some other part of the room. These lattices can be made to run in any direction so as to deposit the cotton at any place where it is required.

Question: Give a statement of the objects aimed at in the operation of opening, and describe fully the treatment of the cotton to effect them.

Answer: The objects aimed at in the operation of opening may be said to be three-fold, viz., first, the opening up of the matted fibres of cotton to a loose, fleecy condition; secondly, the extraction of all foreign substances, as broken seed, sand, leaf, etc.; and thirdly, the regular delivery of the cotton in weight, yard by yard, and to keep it in that condition, by the formation of a lap. These, then, are the objects aimed at in the operation of opening. We will now consider the treatment of the cotton in order to effect them. To open the cotton, which means to pull the matted fibres one from the other, so that the cotton will be in a loose, open, and fleecy condition, it is subject to a machine of one kind or another, as there are differently constructed machines for the same object. But the principle in all is, that one part is stationary while the other is movable, or else the two parts work in opposition one to the other. In Crighton's and Lord's cone cylinder openers, surrounding the grid, are fixed arms of iron or steel. On the shaft are similar arms, which are run at about 1000 revolutions per minute. The cotton is fed at the smallest end of the cone, seized hold of by the revolving arms, flung against the fixed arms, and torn from them over and over again until they

are in a light and loose condition, when a fan draws the opened cotton out at the top. The porcupine cylinder acts in a similar manner. In this case the cotton is fed on a traveling creeper and laid hold of by a feed roller. Whilst thus held, the spikes in the cylinder strike into the cotton, opening it out and dashing it against stationary bars below. This is repeated in the same machine three or four times over, for there are three porcupine cylinders and one beater to this kind of opener. Thus by a continual shaking about the cotton is brought into a loose and open condition. During the operation of opening, the cleaning is also going on, for the cone cylinder is surrounded by bars, placed at an angle with a certain space between them. The bars under the porcupine cylinder are placed at an angle of about 60°, with a space of about ¾ inch at the top, becoming less and less until the bottom bars are almost closed. As the cotton is being knocked about during the operation of opening, the broken seed, sand, leaf, etc., are thrown through these bars, falling on to the floor beneath. The third object, the regular delivery of weight yard by yard and the formation of lap. To the opener as well as the scutcher is placed a feed regulator. This acts upon the feed roller. If too great a quantity of cotton is coming to the feed roller, it is made to run slower; if too small a quantity, it is made to run quicker, so that the same weight is fed through for every yard of delivery. A fan operating upon the cages draws the cotton forward, when it is passed on to the calender rollers and formed into a lap.

Indigo and Other Dye Plants in the Philippine Islands.

Years ago indigo was one of the important products of the islands. In quality the Philippine article compared favorably with the best grade of the Guatemalan product. It used to bring from 61 to 65 cents per pound, but in 1875 the price fell to 23 cents per pound. At present it fluctuates between 30 and 35 cents per pound.

The decline in prices was brought about by a deterioration in quality that resulted in a greatly lessened demand. The cause of this deterioration in quality is easily explained. Years ago the native grower knew and practiced only the most primitive methods of preparing indigo; but with the arrival of large numbers of Chinese in the Philippines, he gradually abandoned the original processes and began to imitate the Chinese practice of adulteration. It was found that by the admixture of a small quantity of lime with the indigo, the coloring matter could be precipitated and the product prepared for the market in a much shorter period. While the more rapid process proved a source of temporary profit, the effect upon the quality of indigo was soon discovered by the purchaser and the Philippine product, owing to the extensive use of lime, fell into discredit in foreign markets. If the practice of intermixing lime should be abandoned and a pure grade of indigo again produced, higher prices would, undoubtedly, be restored.

Indigo is produced in the provinces of Bulacan, Nueva-Ecija, North Ilocos, South Ilocos, Pangasinan, La Laguna, Batangas, Tayabas, Capiz, Bohol, also in several other provinces. The best kind is said to grow in the vicinity of Bayambang in the province of Pangasinan. Most of the indigo exported from the islands goes to China; shipments are also sent to Europe and to the United States.

Other Philippine dye plants that should be mentioned are the sibucao, or sapan wood, the biri, or safflower, the achuete, used as a substitute for saffron, and the quilite, furnishing a red color.

—Recently the demand for patterns obtained by blending fancy shades has extended into every branch of wearable fabrics.

WOOLEN DEPARTMENT.

The Production of Fancy Fabrics.

By A. M. Chapman, Shipley Technical Schools, England.

ARTICLE I.

There never was a time when such demands were made upon the skill of the designer in the production of novel effects in textiles as at present. The cry is always for something new, and though such an infinite variety of styles are made, there is always a ready market for anything really original, especially in regard to dress textures. The day is almost past for large quantities of any one style to keep machinery going for a lengthy period, hence the greater need for clever designers who can constantly adapt themselves to the vagaries of fashion, and apply their stock of knowledge in the production of new and smart effects. To do this is no easy matter, because of the wide range of knowledge necessary.

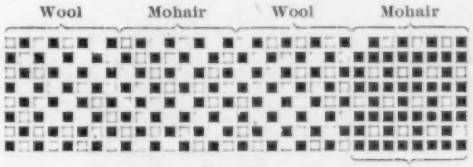


FIG. 100.
Marks represent warp lifted.

It might be asked, what are the chief requirements necessary to fit a man to occupy a position in the front rank of textile designers? First, He should be naturally original, and acquire the habit of thinking out ideas for himself, not copying or following other people. Second, He should have a knowledge of the properties of the material he is using, so that he may know exactly what it is possible to produce in the finished article. Third, He should know thoroughly all the methods of manipulating the threads in either single, double, or compound cloths. Fourth, He should possess the power of combining colors in the very best manner. Fifth, He should have an adequate knowledge of the various ways in which the cloths can be finished. In this connection the designer and finisher must combine to give the very best results. This is obvious, because in many fabrics it is impossible for the finisher to get the desired effect unless the fabric is built aright, or the designer's work may be useless unless the finisher treats the fabric in such a way as to bring out the novelty.

From the foregoing it is seen that a very severe training is necessary to make the clever workman, but immense strides have been made during the last ten years. The designers of today are a long way in front of those of the last decade; competition having stirred them up to greater effort. The real secret of the success of the rising generation, however, is the early training received in the technical school which has given them a wider knowledge, enabling them to produce articles quite out of the ordinary style, instead of imitating either French or German patterns.

There is another branch which has evidently a great future in store, i. e., chemical research in regard to dyeing or treating textiles. Excellent examples are seen of what is meant when one notices the change which comes over the appearance of cotton by the mercerizing process, which gives to it a lustre not unlike silk when dried at tension, or it may be made to form crimps by being allowed to shrink. And, further, by noticing the effect of chlorine on wool, which renders it unshrinkable, it is made possible to produce crimp effects in

stripes, checks, or spots by treating only certain parts with the chlorine. The untreated parts are then shrunk, which draws the parts not shrunk and forms crimps.

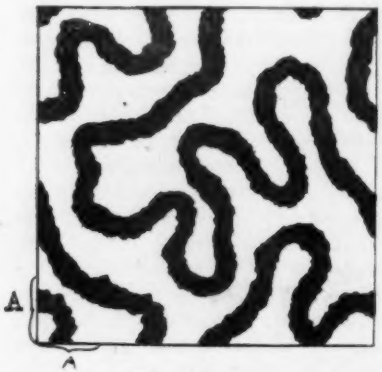


FIG. 101 A.

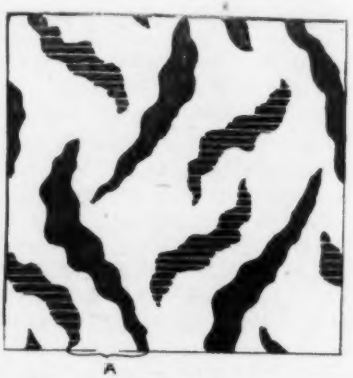


FIG 102 A.

In designing for fancy dress goods, mantlings, etc., the possibilities of producing novel effects are much greater than in the case of suitings, trouserings, etc., because of the latitude allowed both in regard to size of pattern, variety of color, and quality of material employed. In fabrics for men's wear or for ladies' tailor-made dresses, small effects obtain. One of the most useful methods of producing fancy styles for dress goods or mantles of one color, is by the combination of materials which are opposite to each other in their nature—such as

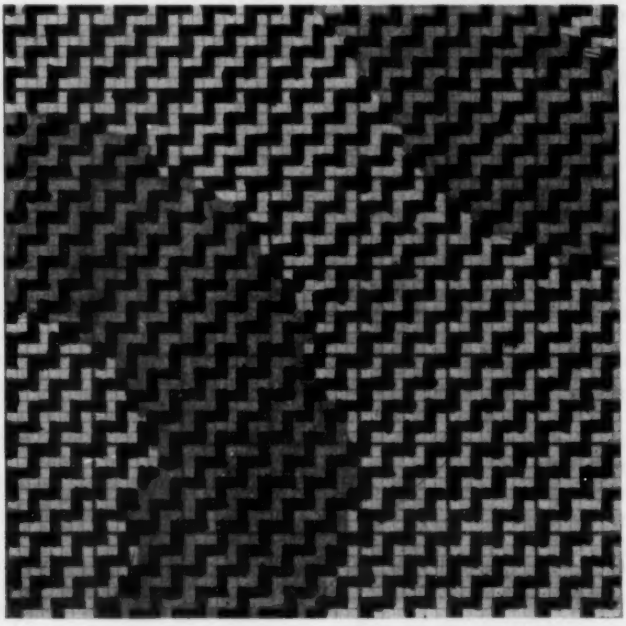


FIG. 101 A.
Black Marks Represent Warp Lifted.

cotton and silk, wool and silk, wool and mohair, cotton and mohair or alpaca—producing that style of effect, so fashionable at present, known as "crepons" and "blisters." The chief features of these fabrics are their brightness and the way in which the figures or stripes are made to stand out or double over. The following is the make of a "crepon" stripe.

Particulars for weaving:—

Warp:—Ground—2/60 worsted, 28 turns per inch, 56 yards long. Stripe—2/40 mohair, ordinary twist, 59 yards long. Forty threads per inch, 4 in a dent, 50 inches wide in reed. To finish 44 inches wide.

Weft:—48 picks per inch, 1/28 cross-bred worsted. Gray piece, length 52/3 yards, to finish 45/6 yards. Plain weave. The 2/60 worsted warp should be Australian Botany wool.

The following is a good style of stripe:—

Plan of warp:—

8	threads	mohair.	
12	"	wool.	
24	"	mohair.	
12	"	wool.	
8	"	mohair.	
30	"	wool	
2	"	mohair.	7 times.
4	"	wool.	
2	"	mohair.	
30	"	wool.	

The chief object to be kept in view in making goods of this class is to bring out distinctly the crimp effect in the bright and lustrous material, and this must largely be done in the loom. The two materials must be on separate warp beams, then weave the wool warp with all the tension upon it that it will allow, and the mohair as slack as is feasible with the forming of a proper shed to allow the shuttle to pass. By setting the warp so as to prevent the mohair threads from the shed, it becomes possible to get in hanging too much in the top part of three yards more of the mohair than

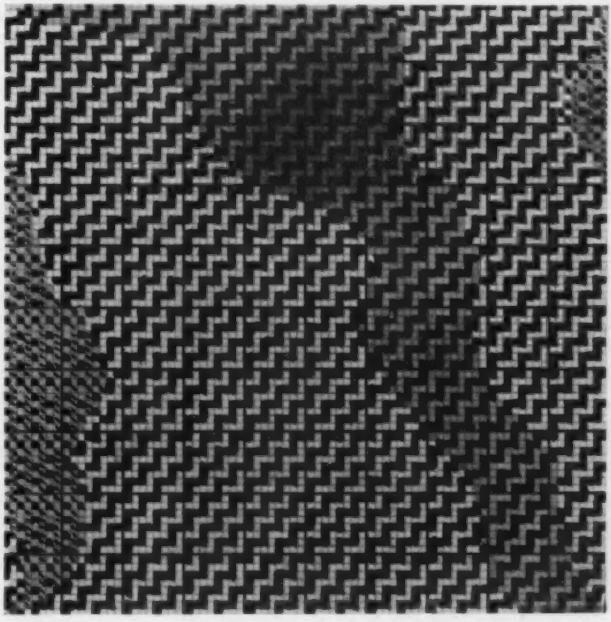


FIG. 102 A,
Black Marks Represent Warp Lifted.

the wool warp, ensuring a good crimp when the piece leaves the loom. But this is further improved in the finishing by allowing the piece to shrink in both length and width as much as possible. The large amount of twist put upon the wool warp helps it to shrink, while the mohair being a material which will not readily shrink, becomes more crimped.

Variety to a stripe of this class may be given by making certain stripes more on the surface than others. On reference to figure 100 it will be seen that at Section A of design every alternate pick floats at the back, and by using a hard-twisted weft, a roundness is given to the stripe. This obtains because the pick floating at the back draws the edges of the stripe towards each other, and prominence is given by reason of the threads being on the surface three out of four picks instead of weaving plain.

Following up the same idea in Jacquard effects, many beautiful styles are made on the principle of double cloths, i. e., having two plain cloths woven on the top of each other, and forming figured effects by bringing the back fabric on to the surface at intervals. The back fabric may be

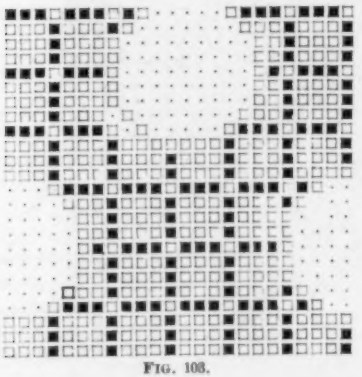


FIG. 103.

mohair, alpaca, silk, or any lustrous material, and the face worsted yarn made from a good quality of Botany wool, which is better if hard twisted. Very often the only place where the two fabrics are bound together is just at the edges of the figure, i. e., when the bright material comes from the back to the surface and back again, which helps to give the roundness of figure which is characteristic of these fabrics. The following is a suitable structure:—

Particulars for weaving:—

Warp:—Ground—2/70 worsted, 30 turns per inch. Figure—2/40 mohair, ordinary twist. 80 threads per inch, 6 in a dent, 50 inches wide in reed, to finish 42 inches wide. Arranged 1 thread worsted and 1 thread mohair; mohair to weave in at least two inches per yard quicker than the worsted.

Weft:—Ground—2/70 worsted, 30 turns per inch.

Figure—2/40 mohair, ordinary twist; 80 picks per inch; arranged, 1 pick worsted, 1 pick mohair. Fig. 101 is a suitable style to show off the bright material, and Fig. 101 A shows a section of design arranged for weaving.

Variety of effect may be got by working certain parts of the figures in rib, diamond, crape or other systems of binding after the character of Fig. 102, which has certain portions set out with a rib weave across it. On reference to a section worked out in Figure 102 A, it will be seen that the rib is formed by lifting up the bright material for seven picks out of eight, and on the eighth pick it is bound down by the wool pick or dull material, giving a well defined rib or cut across, as shown by dots in design.

The designs required for goods of this class are fairly bold in treatment similar to examples shown. This is important, because of the necessity of showing up the bright material to advantage; but in the actual fabric the designs do not appear flat as in the sketches, because of the crimpy character imparted in the weaving. It is impossible to show up to advantage any designs which contain fine lines, such as the stems of plants, or veins of leaves and flowers. For this reason designs which are an adaptation in many cases of sketches made from seaweed are most satisfactory.

The qualities of material already explained are best adapted for blacks,

but the same designs may be made to apply very well in two colors, by having a black or dark colored ground, with a light colored silk figure, which, of course, is more expensive. The colors of silk should be pale green, pale blue, pale yellow, light gold, lilac or heliotrope.

Particulars for weaving:—

Warp:—Ground—2/70 worsted, 30 turns per inch. Figure—60/2 spun silk, 3 ends as 1. 80 threads per inch, 6 in a dent, 50 inches wide in reed, to finish 42 inches. Arranged 1 thread worsted, 1 thread silk. The silk must be let in at least two inches per yard quicker than the worsted.

Weft:—Ground—2/70 worsted, 30 turns per inch. Figure—60/2 silk, 3 folded, about 1½ turns per inch. 80 picks per inch; arranged 1 pick worsted, 1 pick silk.

Some very pretty styles can be produced in two colors by having a silk figure on a plain canvas ground, giving an effect similar to the simple plan shown in Fig. 203, of which Fig. 103 A is the working design. The black lines represent a thick worsted canvas yarn, which is weaving plain in warp and weft. The figure shown by means of dots also weaves plain, being cotton in the warp and silk in the weft, with three ends and picks to one of canvas yarn. It will be seen there are two plain cloths—the face cloth worsted canvas yarn, and the back cloth, cotton warp and silk weft, the figure being formed by bringing the back cloth to the surface.

The following are references for Fig. 103 A. Squares show plain working for face cloth. Crosses (×) show plain working for back cloth. Dots (.) show plain working for figures.

Crosses (+) show marks for lifting canvas warp, when back picks are going in, and also to lift back threads to the top in figure when canvas pick is going in.

The style of design for this fabric must be very similar to those already described, but whatever it is, the outline of the figure will always be more or less of a stepped character, because of the way in which the thick yarn joins on to the small and the proportion of threads being three to one.

Particulars for weaving:—

Warp:—Ground—3/24 worsted canvas yarn. Figure—2/180 cotton. 68 threads per inch, 48 inch reed, to finish 44 inches.

Weft:—Ground—3/24 worsted canvas yarn. Figure—60/2 spun silk, 68 picks per inch. Three threads of figuring material to one thread of ground material in both warp and weft.

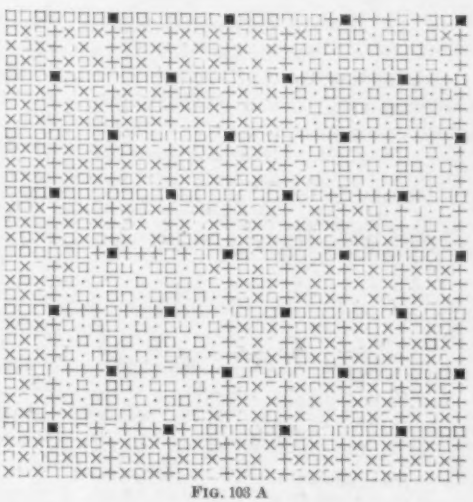


FIG. 103 A

The canvas yarn requires to be twisted so as to give a good round thread, and must be woven as tightly as possible.

An almost endless variety of crepon effects may be made with a net silk warp and a thick crimped worsted weft, some examples of which will appear in the next article.

The Science and Practice of the Construction of Woven Textures.

FRED BRADBURY.

(Continued from May.)

Let it now be assumed that it is de-

sired to produce a new cloth upon the same principle of setting as the two previous cloths of which photographs are given in Figs. 37 and 40, the cloth to be of similar kind and description as Fig. 40.

Let there also be given the following kinds and sizes of yarns, warp and weft.

Warp:
1 thread 2/48s Botany—dark brown—dia. = square root of 24 × 560 — 10% = $\frac{1}{11}$.
1 thread 2/48s Botany — purple — dia. = square root of 24 × 560—10%=$\frac{1}{11}$.

Weft:
1 pick 1200 yds. per oz. tram silk — blue—dia. = square root of 1200 × 16—8% = $\frac{1}{13}$.
1 pick 2/66s Botany—olive — dia. = square root of 33 × 560 = $\frac{1}{13}$.

Weave:—Double in ground or body of cloth, but each color of warp to show its self color at suitable intervals upon the surface of the fabric. The figure to be in weft flush in two colors, viz.: blue tram silk upon the dark brown ground, and olive wool weft upon the purple ground. These factors in the cloth structure are best illustrated by the cross section through the warp given at Fig. 43. The relative interlacing of the warp and weft threads are indicated by the letters a, b, c, d, which respectively represent the dark brown and purple warps the tram silk and wool wefts.

FIG. 43.

A study of the illustration, Fig. 43, will make clear that the silk weft interlaces plain with the brown warp "a" and flushes over the same color of warp as required to produce the weft figure on the face, while upon the back of the texture this same weft interweaves $\frac{3}{1}$ twill. The wool weft interweaves plain with the purple warp "b" at the back, and also upon the face of the cloth in the ground, but it flushes over the same color of warp according to the requirements of the figure. The point paper or working design, together with the card cutting instructions would be similar to those given with Fig. 42.

Suggestion:—If the respective shades of warp be respectively a cold or neutral, and warm or luminous, color, the two wefts might be made to produce a figure or portions of figure upon each color of warp, with the result that the visible hue effect of the bright colored wefts would be distinctly different upon each ground or shade of warp color. By a cold color is meant a deep color inclined to blue and its derivatives; by a neutral color is meant a deep color inclined to brown, and its attributes. By a warm or luminous color is meant one that is bright and advancing, such as red or yellow, and all such colors which attract the eye before other colors. The foregoing suggestion opens up a most important and interesting subject. It introduces us into a field full of material and food for thought, where research and experiment might be a welcome and inspiring task, but for the present I must confine my attention to the specific subject of science and practice of cloth construction, with the exception of one brief deviation. Since color is such an important factor in most woven fabrics, it will not be found inappropriate if I illustrate the suggestion above by one example selected from practice.

As I now write, there is before my observation a colored woven fabric produced to my own instructions. The ground is in two colors, viz.: One, deep blue; two, red, slightly inclined to cardinal. There are several colors upon each of these grounds, but for the purpose of illustration, I propose to consider only two of them. These are: One, deep orange, slightly inclined to reddish brown; two, an olive green. Each of these two colors, when seen together upon the two ground colors, deep blue and red, appear very different in hue, and fre-

quently as different as when the same color of a pile warp is viewed simultaneously as cut and uncut pile. In fact, unless it is known that the two colors are respectively identical, it is difficult to convince any observer that they are the same colors, but upon different ground colors. Since we know that the yarns are respectively of the same hue, the effect is necessarily an optical illusion, but it is an optical illusion which, when the laws and principles of color are well understood, may be turned to practical advantage.

One general and useful law which governs all combinations of color possessing complementary and contrasting hue, tint or tone, may be briefly stated thus: When two or more complementary and contrasting colors are in juxtaposition, the visible effect of each contiguous color is that they are separately modified in hue, tint or tone, according to the complementary or contrasting color with which it is contiguous, for each color adds to its contiguous color the complementary color of itself. Thus, in the example before me, the orange brown appears upon the deep blue ground, more decided, purer, intenser and brighter. It has no inviting effect, but is pleasing and luminous. Upon the red ground it appears to suffer somewhat in intensity and brightness. Its hue is lowered, and though the effect cannot be called bad, it is nevertheless inferior to the former. The explanation which may be assigned for this change of effect is that the blue ground adds its complementary orange to the orange red color, and thus makes it more orange, while the red ground adds its complementary green and dilutes or lowers the tone of the orange red. Passing on to the olive green, we have a color which may be generally described as a harmonizing color, since it usually looks well in most combinations. Upon the red ground the olive green is heightened in intensity, brightness and clearness, being due to the green which its contiguous color, red, has added to it.

Upon the blue ground the olive green appears more subdued and would, as compared with the above, be allotted a lower position in any scale of hues in which green was a predominant factor. These changes as already expressed, and as will be readily perceived, are simply optical illusions, but are of great practical value, therefore every producer of woven fabrics in which color enters as a factor, would be well repaid if he made a specific study of this branch of his work, apart from the great interest which he would experience in his observations and experiments.

Reverting to the construction of the assumed required cloth section as at Fig. 43, it is well to remember that any decrease in the angle of curvature of warp or weft below 30 degrees requires a very small and vanishing reduction in the number of threads (weft in this example) to retain the ideal structure of fabric.

Generally an angle of from 15 to 20 degrees, according to my observations, assists the warp in producing the most satisfactory cover. On the contrary, as the angle of curvature of warp increases from 30 to 60 degrees, the number of threads of warp increases with what may be suggestively described, a constant acceleration, i. e., an increase in the angle of a few degrees as it approaches to a limit of 60 degrees involves a greater increase of threads than would be found necessary for an increase of the same number of degrees near the theoretical starting point of 30 degrees. This statement will be evident upon referring to the particulars of structures of either Figs. 37 or 40. When the angle of 60 degrees is reached, the number of threads required will be equal to the number of diameters of warp per inch which gives 104 threads, and then the angle produced by the weft would be about 15 degrees (Fig. 10). The number of threads of weft per inch would be de-

termined upon the basis of Formula IX. thus:—

(1 dia. of warp + 1 dia. of weft) × cosine of angle 15° ($\frac{1}{124} + \frac{1}{132}$) 0.965 = (122 × 104) ÷ (104 × 122) × 0.965 = $\frac{1}{126}$ × 0.965 = $\frac{1}{60}$ nearly, or 60 threads of weft per inch finished.

But in practice by design or otherwise it will generally be found that the threads of warp are not usually set to the full limit of their diameters. The average angle of curvature being more generally about 56 degrees for warp and 20 degrees for weft. The sets of warp and weft threads obtained from these two sizes of angles represent those which I should select as being most likely to produce the best results in cloth structure and development of figure and color in woven textures of the description which are now under consideration.

Hence the following set of warp and weft is most suitable for the particulars of warp and weft given above for Fig. 43.

By formula IX:—

Warp threads. (warp $\frac{1}{124}$ + weft $\frac{1}{132}$) cosine of 56°. Cosine of 56° = 0.559. = ($\frac{1}{124} + \frac{1}{132}$) × 0.559 = $\frac{1}{126}$ × 0.559 = $\frac{1}{113}$, or 93 threads per inch of warp.

Weft. ($\frac{1}{124} + \frac{1}{132}$) × cosine of angle 20°. Cosine of 20° = 0.939. = ($\frac{1}{124} + \frac{1}{132}$) 0.939 = $\frac{1}{64}$ × 0.939 = $\frac{1}{68}$ nearly, or 60 picks of weft per inch.

This is purely a theoretical cloth, that is, one which I have not made, but it is constructed upon the same principle of science and practice as the actual cloths described in connection with Figs. 37 to 42 inclusive. I have, however, no hesitation in asserting that the particulars as determined heretofore will produce a fabric which shall be thoroughly satisfactory in structure, handle, appearance and effect.

(To be continued.)

Forced Draft for Marine Boilers.

Although forced draft for increasing the rate of combustion was used in the United States navy during the civil war, it did not come into general use for naval vessels until about 1882, and in the merchant service still later, but since that time its use has become universal. Indeed, were it not for forced draft, boiler weights would be so great as to have long ago set the limit to speeds of the faster class of vessels. When natural draft alone was used, the maximum rate of combustion with the best free burning coal and good chimney draft did not reach 20 lbs. per sq. ft. of grate. with forced draft in large cylindrical boilers, there are now numerous reliable records of 40 lbs. per sq. ft., while in the locomotive and water tube boilers, 80 lbs. is now a common rate. and data have been published of over 100 pounds.

While the economy of evaporation at these high rates of combustion is not so great as under natural draft, the enormous reduction in boiler rates is very marked. Trials of the boiler of the United States torpedo boat Cushing, for example, show an increase in I. H. P. per ton of boiler of over 50 per cent., when the rate of combustion is increased from 24 to 40 pounds per square foot of grate, which means a decrease in weight per I. H. P. of over 33 per cent.

Except on Mr. Howden's part, the question of economy under forcing was for a long time ignored, designers being content with the great gain in power. At the present time, however, the question of economy under forcing is receiving great attention, and we may confidently anticipate this as one of the features of marine engineering.

—One of the results of the improved taste in textiles is the increased manufacture of fabrics in which the patterns are minute in character and choicely colored.

—The fabrics worn by the last generation and the cut of the garments are so extraordinary as to be positively vulgar in aspect.

—So long as the customer asks for a particular class of fabric, the manufacturer must perforce produce it; so long as the fickle changes of fashion reign paramount, the designer is not a free agent in his inventions

KNITTING DEPARTMENT.

The Knit Goods Situation.

The unbroken stretch of torrid temperatures through the first half of June gave light weight underwear a boom, consequently lines of balbriggans and fancies are decidedly broken and promise to so continue for several weeks.

Fancy underwear, by the way, is slowly but steadily increasing in use in the East; fancies have long been popular in the West. Open work designs are in special favor.

Speaking of light weights suggests the fact that finer grades have been steadily working toward the front the last year, or more. The finer grades are used mostly in order to avoid bulk. Natural wool goods manufacturers are encouraged accordingly.

Heavy weight business, as might be expected, is featureless; duplications can scarcely be looked forward to for two weeks.

Pure silk underwear has recently been in better request, but there is no certainty that the call will be sustained.

The strong wool markets have not yet produced much effect, although they might well have been expected to do so. When the time comes, it will be all the sharper in consequence, particularly on goods of higher grades.

Sweaters with turn down collars purporting to be suitable to wear with neckties are among the latest vagaries. Several particularly reverberant styles of sweaters are enjoying transitory popularity, including wide striped patterns of gold, deep red, etc.

Business in foreign hosiery has reached a total not to be sneezed at, although most of the deals are of small size. The late spring business has held on rather better than could be expected, owing in part to the backwardness of the season.

Foreign advices have materially strengthened the domestic situation, although the Chemnitz reports are usually heavily discounted. Lace goods more than keep up their end, despite the lateness of the season. Fancies, too, are taking a little spurt. In these vertical stripes, ingrains (in ribbed goods) and dot effects and combinations in red, blue and black just now have the call. Embroidered goods, stripe and boot patterns have shared in the improvement, also extracted goods of higher quality.

One foreign house offers a novelty in hose with metal threads interwoven. These are designed for evening wear, being extremely showy. Persian effects are still able to hold their own.

In the fancy realm, black boots with plain tops and striped boots with plain tops are in about equal demand.

Such fall orders on woolen hosiery as have been taken are mighty light. When the qualities of these goods are restored to a reasonable point, their recovery is only a matter of time.

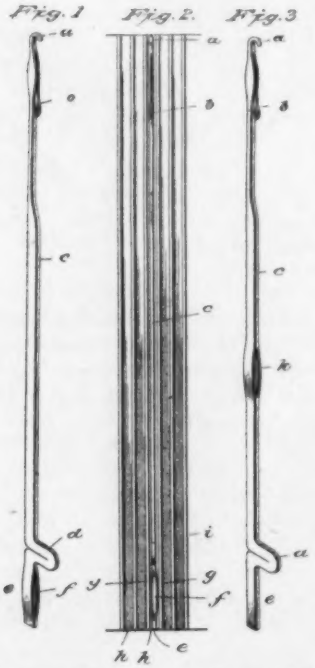
Golf hosiery is ill—very ill. In this department it looks as if the price slashing would not stop short of positive slaughter. The market, to be sure, is heavily overloaded, but it is susceptible of recovery. Just give it a little time.

Knit goods men are looking forward to the summer complacently while there is nothing especially hopeful in the situation, they characterize the outlook as healthful and await developments with the buoyancy which has so distinguished them for two or three years.

—The difficulty of the task of the originators of textile novelties is intensified by the necessity of devising new patterns and cloths which will comply with prescribed climatic, national, and local conditions.

Knitting Machine Needle.

We illustrate a knitting-machine needle of the class which is designed for use in those knitting-machines in which the needle is moved upwardly by a cam and retained in such position for an interval in the cycle of motions of the machine. The object of the device is to provide the needle itself with means whereby it will be frictionally held in such raised position.



Such needles are usually constructed with springs having free ends; but while this construction affords the necessary elasticity in the needle itself to hold it, the needles are difficult to insert in the grooved cylinder or needle-support, and, moreover, in the reverse movement the free ends of the needles have a tendency to wear away the metal of the grooves and form irregularities therein, with the result that frequently in such reverse movement these worn-away portions form obstructions for the free descent of the needle and the needle is broken. This constitutes an objection which the present device is designed to overcome.

This contrivance consists of a knitting-machine needle slotted longitudinally and having the walls of the slot bulged out laterally to an extent sufficient to exert enough pressure against the walls of the groove of the cylinder to support the needle frictionally within the groove, and without constituting any obstruction to the free insertion of the needle in the groove, and without impeding the downward movement of the needle in the groove, and also without any liability to wear away the groove irregularly. The illustrations give a perspective view of a knitting-machine needle containing one embodiment of the contrivance, and an elevation of portion of a grooved needle cylinder or support with a needle in position in one of the grooves; also a perspective view of a knitting-machine needle containing another embodiment of the contrivance. The hook a, latch b, body c, and heel or shank d of the needle may be of any approved construction. The foot or lower end e of the body of the needle is provided with a slit or slot f, which may be conveniently made by means of a circular saw, and the walls of this slit or slot are bulged out laterally, so as to come into frictional contact with the walls g of the groove h of the needle cylinder or support i, a portion only of which is shown.

Instead of forming the slit or slot in the foot or lower end of the needle, as shown in Figs. 1 and 2, it may be formed in the body of the needle, above the shank or heel, as at the point k, Fig. 3, or at any other point along the body of the needle.

The laterally-bulged walls of the slit or slot have sufficient elasticity to retain the needle in any vertical position to which it may have been moved by the action of the cams and which it is desired it shall retain until in the cycle of movements of the machine it is necessary to return it, and inasmuch as these walls are continuous and joined at both ends to the body

of the needle, there are no laterally-projecting free ends to wear away the walls of the groove, and thus endanger the needle and its descent, and moreover and for the same reason, the needles may be readily inserted in the grooves.

The Practical Knitter.

To be a practical knitter requires a great deal of experience on all kinds of goods. We find lots of people who think they can knit. They can, but they are not practical, unless they can fix the machine when it is out of order. Manufacturers are trying so hard to keep up with the market that they put up with cheap help.

A knitter must watch every head he is running. His mind must be on his machine all the time, and ought not to talk unless heads are stopped, and then must know what kind of yarn he is putting on. With so much competition nowadays, a knitter running eight large heads may have a different kind on each head. I mean by this different numbers of the same color. He must not waste any needles by smashes; and when I say waste, I mean such as can be saved by a good operative.

When the yarn pulls up three or four ends at a time, and catches around the beards of the needles, some operatives will take the handle and turn the head, expecting the web will pull itself up and clear the waste and bunch that run in off the bobbin. A good operative will never do this, but rather take off every loop wheel, say four, then take off all his pressers, turn around slowly until he gets all the waste off. Then look at each wheel carefully and see if the blades are bent or rough, taking the loop wheels first.

The first thing in the morning an operative should oil under every wheel and every presser, trying hard not to get it on the web, as every spot will spread and go through. The reason I say morning is, because when the machine is stopped it has a chance to work through. When a head is dropping stitches, don't try to run it and make waste of valuable yarn. Stop and take off the loop wheel and see if it is rough. If you find it rough, smooth it on a piece of card clothing. If it doesn't stop, take off the landing wheel and see if it is smooth and if the blades are bent. Also see if they enter the needles in the centre, and are not too high or too low. If they are too high, it will cut the stitches.

The dividing wheel must get particular attention as it is of much importance. It divides the stitch and if the stitch is not divided rightly, and evenly, it will not make good, nice, even work. Some may think it even, but it is not. What we call the side wheel is for keeping bunches and thick yarn from running in the guide, and also protecting the loop wheel. This must be kept on all the time, as no operative knows what minute a bunch is going to run in and break from one to two hundred needles, and bend the wheels. Then the push-back wants to be set just right. This pushes the web down after it is knit, and gives the wheels a chance to do their work. It must come close to the bottom of the needles, and must not touch bottom.

The presser is set directly over the landing wheel and should press the needles to allow the stitch to pass over the points. Brass pressers are very good in my opinion as they do not wear the needles. It should never be allowed to rest on the points of the landing wheel. The knocking-over wheel is placed behind the landing wheel and finishes the stitch after the landing wheel has put it over the needles. The guide which carries the yarn should be set close to the loop wheel. If set too high, drop stitches will be the result; if too low, yarn will drop off the wheel and the web will press off. The circular spring needle machine is what I have reference to in the above. It is a four-feed machine; we have some two-feed.

PUSH-BACK.

Loop Transferring Mechanism.

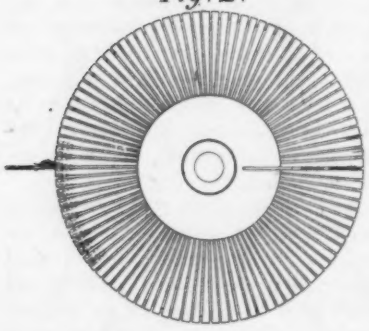
The scheme which we illustrate, having for its object transferring loops in the simple domestic circular type of stocking knitting machine, may be interesting to many of our readers.

Owing to the necessarily restricted dimensions of the radial needle-bed and limited space for operation, the present transfer devices are defective. The present device is a compact and simple transfer arrangement, avoids some of the disadvantages of existing transfer methods, and, furthermore, is applicable to existing fine-gauge as well as coarse-gauge machines, which, it is thought, has not been heretofore accomplished.

To that end this mechanism consists of the following improved construction and combination: first, a needle having its flexible end twisted and bent out of line of the needle and hookward into a loop-expanding shoulder and its knitting-stem set down to a loop-stopping shoulder in a manner so as to retain the usual width or gauge and dimensions of the needle and needle-groove and also retain the simple form of needle-foot, consequently maintaining the maximum strength of the parts and the simple form of knitting-cams existing in this class of machine; secondly, a needle-bed, the grooves of which are integral with the base and are opened out in a manner that sufficient loop-clearance is given at the base of the grooves, while the upper parts of the grooves, extending beyond the base, remain unopened to support the feet of the needles when thrust beyond the knitting-point to the transferring-point, avoiding the compound or built-up bed formerly employed and maintaining the maximum strength of the ordinary needle-bed.

Fig. 1

Fig. 2.



It will suffice to describe this arrangement as applied to the sliding latch-needle, from which its application to a sliding bearded needle will be obvious. Fig. 1 is a sectional elevation, and Fig. 2 a plan, of the needle-bed of the radial type used in the domestic knitter, containing a needle in the loop-drawing position on the right side and a needle on the left side, linking its loop to a needle of the opposite set. Referring to the illustration, the needle is beveled off so as to lead the hook of the opposite needle up between the knitting-stem and the loop-expanding shoulder of the flexible end of the needle, which is folded hookward and bent and twisted to the side of the needle-line into a loop-expanding shoulder, terminating in a needle-point forward of the foot, which is of the ordinary simple type and level with the knitting-stem, which is set down, forming a loop-stopping shoulder, the whole needle, except the latch, being formed out of one piece of wire. The loop-expanding shoulder is sufficiently flexible to contract to a position beneath the inflexible stem of the needle proper, whereby the needle is not reduced, and consequently weakened, or the needle-grooves enlarged or their supporting-walls consequently weakened, as is the case in many transfer-needles, where the loop-expanding shoulder closes on the side of the needle. Therefore owing to its construction the needle conforms to the normal dimensions and conditions of ordinary needles and needle-grooves of this type. Shallow openings are cut in the needle-grooves, with a V-

shaped tool set at an angle to the base of the groove, obtaining adequate clearance for the casting of the loop and leaving the grooves unopened at their upper part and continued or projecting beyond the base of the bed, allowing the needles to be thrust beyond the knitting-point for the purpose of transferring without the needle-feet losing the support of the needle-grooves and keeping the walls stronger in this part than in the ordinary bed even, and the walls of the grooves and the base being integral, avoiding the built-up or compound bed used heretofore.

The needle is operated by the foot engaging cams, the construction of which is so well known as not to require repetition here. In operation the transfer-needle knits loops in the ordinary manner, and in order to transfer a loop it is thrust beyond the knitting-point to the transfer-point (seen on the left side of the drawings), the point of the tail piercing the loop, which thereupon mounts the loop-expanding shoulder and loop-stopping shoulder, and is opened out or diverted sidewise to admit the hook of the adjacent needle of the other set, which being timed to so act by the action of cams, the construction of which is well known, slides upward between the knitting-stem and the loop-expanding shoulder, penetrating the knitted loop. A needle then withdraws, the flexible loop-expanding shoulder yielding to the passage out of a needle, the loop of another needle being linked around the first needle.

—A useful flannel of good medium quality may be produced from Australian wool alone, and skin wools, or slipes, as they are termed by the trade—i. e., the wools from the skins of slaughtered sheep, dead wool—can be employed with advantage. At the same time, if employed by itself, the cloth will be flat and deficient of bulk.

—The Pennsylvania Museum and School of Industrial Art in Philadelphia is evidently a live institution.

Knit Goods About Chemnitz.

I wonder, sometimes, whether it will ever be again in Chemnitz as it was in the late eighties and early nineties. When told that exports to the United States went up to eight, ten and twelve million dollars, in these years and down to four and five in 1897 and 1898, and that 1899 will record only $4,000,000, you must not imagine that moss is gathering on the walls of Chemnitz mills, or that grass is growing in its streets. The stranger that gets inside this city's gates, finds himself in the midst of activities unprecedented in its history. Like every large city, in the empire, Chemnitz is breaking with the past. The ugly old edifices, hideous conglomerates of as beastly an architecture as ever disgraced a city's streets is doomed; magnificent buildings, embodying the best in Italian, French and German Renaissance are going up as rapidly as builders can get materials.

Chemnitz has lost a very large slice of the U. S. trade. Will it come back? The territory lost is gone. Even Canada that kept on buying even after her 15 per cent. duty is turning to Nottingham, Leicester and Loughboro.

The month past all went well. Prices went up. This because of advances in yarns. Everybody is full of orders; at least they say so, and lying is not popular. The outlook is fair. The summer of 1900 promises to be better than this year. The market is in bad shape. There is such difficulty in getting down to anything very definite. The desire is to get goods out at the dollar, dollar fifty and two dollar limits. If goods that go to other countries for 5.20, 7.50 and 9.50 can be carried over our customs walls at 4.40, 6.50 and 8.75, enough off to get them down to the desired limit, does anybody doubt that it will be done? Demoralization is as good a word as any with which to measure the situation. The fight between factors and manufacturers is off; but only for a time. There are turbulent elements waiting and watching for the word

to begin again. Factors, fond of selling direct, do everything in their power to coax buyers to come to their homes in the hills. They go, and they get goods cheap. Why not? Are not the factors' goods precisely the same as those the makers sell to the big Chemnitz houses? Of course. A writer, in a local paper, recently, went out of his way to pelt mud at the factors. He failed most egregiously. Don't worry, one such word, even if not apropos, is wanting to indicate the bigness of the failure. The goods going are mercerized. They look like silk. Will the gloss wash out? Staples are going well; so too Petinets, Richelieus, Rembrandts and all kinds of stripes are selling. Staples have gone well all winter and spring. Spring goods are doomed. Your people put forth much better values than can anyone here. This is conceded on all sides. Everybody boasts of a tremendously big business, but, when I go over the returns published here, from time to time, by the U. S. consul, I wonder who has given and who is filling the orders. Think of the houses that have agents here, on the ground, think of the houses that send agents here.

The dawn of a bright day was recorded, in the glove world, when some one put buttons to the fore. Today there are repeats enough to keep all hands going. No one is able to fill all the orders on time. The very best houses have to ask "time." Prices too are satisfactory. Orders for winter goods are being booked. The outlook is bright. Nice combed yarn goods have gone well; so, too, all heavy lines. Ringwoods in wool, mercerised cottons and cotton imitations of wool have gone like hot cakes at a country fair. So great is the call for gloves that all kinds of elastics, clasps, etc., as well as buttons, are wanted.

Limbach, Hohenstein and Chemnitz were never busier than they were this winter and are now in this line. Summer goods are hardly out of the custom house before repeats are cabled. Even orders for winter goods have been going in for some time. The run up in yarns, especially woolens, came near giving this line a black eye. A mark in two pounds is a pretty big difference. Only the very best goods are being bought. Some sweaters, a few sporting goods have gone. Silks, half silks and fine lisles are favorites. Lots of net goods are going. Here, too, a time is coming when no great quantities will go to the States. I hear it in Kaiser and Carola, from the best judges, that Uncle Samuel is turning off hose, underwear and gloves so good and so cheap that competition by parties here is not possible. Chemnitz has gone in a good deal, of late, for tulles. This is or was a good move. Formerly quite large quantities of the tulles used in lace works were imported from England. Now they are to be made here.

I hear that England is rapidly running to the front again in woolen goods, in hosiery particularly. Once aroused, her powers are great. Her indifference during the last twenty-five or odd years in watching and working against her rivals is hard to understand. England is prosperous? Yes; but is she really prosperous, has she prospered in the ratio maintained here? That is the question. Endowed by nature with opportunities earned here only by the hardest work, she has kept no such pace as has this empire. Her prosperity and progress have hardly been normal, that is based upon her wealth of resources. Germany's has been abnormally great; everywhere, and every day something is being done to build the industrial, industrial art school systems up to the highest perfection. Nothing is neglected. I read recently that an effort is to be made to get Limbach to exclude foreigners from its knitting school.

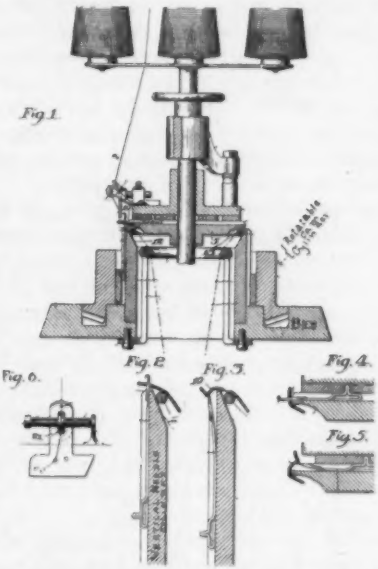
BROWN.

Chemnitz, Saxony.

—Crimp on woolen fabrics may be produced by printing them with certain reagents and subsequent steaming.

Rib Knitting Machine.

We illustrate in connection with this, certain devices to be attached to rib knitting machines, of the class wherein are employed two sets of needles of which one set works in a vertical cylinder and the other in a horizontal dial, the object being to provide a certain construction of cylinder and dial whereby is effectually obviated the breaking of the needle-hooks heretofore resulting from the accumulation of defective work on the needles or the feeding of irregular or knotted thread thereto, and also to provide upon the inner edge of the cylinder, adjacent to the dial, a welt-supporting ring which may be applied to or removed from the machine, as convenience or necessity may require. Figure 1 is a transverse vertical section through the head and adjuncts of a rib-knitting machine embodying the device. Fig. 2 is a section through one side of the cylinder, showing a descending needle therein and an accumulation of thread or defective work in the path of the needle-hook. Fig. 3 is a similar section showing the action of the cylinder upon such accumulation and the manner in which the needle-hook is preserved. Figs. 4 and 5 are sections similar to Figs. 2 and 3, respectively, of the dial and its needle. Fig. 6 is an elevation of the tension device and thread-guide.



The main feature of the mechanism consists in so constructing the walls of the needle-grooves in both the cylinder and the dial that in the event of an accumulation of thread or defective work in the path of the hooks of either the vertical or dial needles or in the event of the delivery of thick or irregular thread thereto, the hooked ends of such needles will be drawn or lifted to the outer edges of the respective walls in a manner to relieve the hooks from the undue strain and consequent liability of breakage to which they would otherwise be subjected. Accordingly the outer end of each of such walls at or beyond the point where the thread is drawn by the adjacent needles is beveled or inclined. The bevel or incline lies in the path of the thread accumulation as the latter is drawn downward or inward by the receding needle-hook, which accumulation in consequence rides upon the opposing bevel or incline and, perforce, draws the hooked end of the needle outwardly, as illustrated in Figs. 3 and 5. Such bevel or incline thus constitutes, in effect, a cam member. The accumulation just mentioned may be and usually is caused by the breaking of the thread on its passage either to the vertical or the dial needles—that is, upon such breakage the thread may miss several needles before it is re-engaged by succeeding needles, in which case that portion of the web in the intervening space runs off the needles and the portion subsequently knit between the needles collects until the tension of the downwardly-moving web is sufficient to draw off the accumulation. The tension device is arranged on the dial cam-plate at or adjacent to the usual thread-guide, so that the thread is fed to the needles under uniform tension, irrespective of the slackness of the thread above the guide. The guide is supported on the dial-plate in the

usual manner and is provided with upper and lower guide-eyes, for the passage and guidance of the thread. The tension device is located between these eyes.

Ribbed Stocking.

WITH A SEAMLESS FOOT

We are supposed to be in the knitting room with the necessary tools and regulations to maintain good order and to get good work, with an overseer who will see that they are complied with.

The first thing to take up is the winding, which is a very important factor in view of the fact that there are many different methods adapted to many different kinds of knitting. For instance, the ordinary cup winder can be used for the rib loom, but when you come to use it on the seamless machine the results are not so good. Why?

I will set forth some of the most important reasons. Every knitter knows that tension on the yarn is a very important factor in knitting. However, it does not necessarily follow that it can be employed all along the line; and when it is, it must be uniform; and one cannot get a uniform tension from yarn wound on a bobbin, as there is very little tension when the bobbin is full, and as the yarn is knitted off the tension increases by coming in contact with the end of the bobbin. Therefore, every one buying machinery should know just what is adapted to his special case in order to get the best results.

Now comes the rib machine. The first thing in order on this machine is to know what you wish to manufacture, that is, the gauge, weight, etc. The next thing is to set the machine and get the best results, not losing sight of the fact that the texture of the fabric is the thing to have in mind at all times. I have seen knitters let the stitch out and tighten it up by doing this and by doing that, but when they finally got the machine working the fabric was worthless, so to speak.

Now let me say right here. In taking care of machinery it is always important to understand that, if the manner of procedure is along well defined lines the results can be confidently predicted. In other words, it is important to know the positive effect of definite causes, and sometimes it is scarcely less important to know that certain means will not produce desired results.

I will now make a few suggestions which I hope will be of interest to some of the many readers of this article. On being called to fix a machine find the trouble and remedy it afterwards; and as there are many causes for the same thing it is always advisable to go well by the rules which govern them. The rule for setting the caps is to have the dial needle-latch close behind the carrier just as the cylinder needle-latch has touched the hook; although in this, as in nearly all other things, the rule will sometimes fail, as perhaps the cams are worn or have been ground, and you will have to allow for what has been taken off. But the object in view at all times is to get the needle drawn in, in time to get the thread; taking care not to have it done too quickly, as that will throw the stitches off. The rule is to draw in so the yarn will pass along about one-eighth of an inch from the end of the latch.

To set the carrier, have the heel back as far as it will go and not touch the cylinder needle latch, when closing, and have the distance just enough to let the hooks pass under when making the welt. The front end of the carrier should not be set too far away as this would cause drop stitches on the cylinder needles, and will also bend the latches. Bending or breaking needles in the welt is caused by the work being too tight on the cylinder needles, thereby carrying the work up under the dial needles which raises the dial needles so the latches come in contact with the front end of the drawing-in cam; and as

there is no other way for them to get by they are either bent or broken.

Sometimes there is not enough room between the dial and the front end of the drawing-in cam. In this case round the front end, and smooth it so if a latch happens to come in contact it will carry it down rather than bend it. Now if the carrier is kept smooth on the inner surface and on the bottom, there should not be any trouble in either bending or breaking latches, unless caused by the take-up. If it does not pull evenly, or not hard enough, this will let the work up onto the needles, and, of course, will bend them and will also so cut holes and drop stitches. The drawing-in cam will also cut holes, if set in too far or not ground right. This cam should be set so as to just cast off the stitches.

In putting in the knee cap, set the splicing tackle so it will line with the hole in the carrier, taking care that it gets good contact with the main thread, and then adjust the nippers so they will just break the thread. If they are on too hard they will cause the yarn to break too near the hole in the carrier, or the nippers may be set so the thread will fly out of their jaws, and that means an imperfect stocking. The sudden closing of the jaws of the breaking-out mechanism will also cause the thread to break, as above described.

I think the above will cover the rib machine pretty well, excepting a few minor points which I do not think will be necessary to mention here, so will now go over and have a look at the toppers and see how they are getting on.

It is very important that they get on all of the stitches, and, when doubling on, it is best to put two stitches onto every other needle, as this gives an equal distribution of the stitches, and will prevent them from being bulky in places, as I have seen them. As every knitter is familiar with the different processes of topping I need not dwell on them here.

In footing seamless stockings put the cylinder in the machine (if you are using that kind of a machine), clamp it, put down the carrier, and start it up. If the machine is in good condition, and if it is a full automatic, it will go through the motions and you will soon have a stocking footed. On the other hand, if the machine is not all right you will have to make it right.

I will mention some of the things that are liable to happen most any time. If the machine is not in time it will break the buts of the needles. As the machine changes back and forth it must have motion enough each way to clear the buts of the needles as it will either bend or break them. To time nearly all machines it is necessary to lift up the head and set the gear that drives it either back or forward, as the case may be. It is advisable to spot the gears when you have an occasion to take the machine apart, as it will enable you to put it back just where you took it from with the least trouble and delay.

There are various causes for dropping stitches. I will mention a few of them. The carrier wants to be set the same, or nearly so, as on any other latch machine, according to the yarn you are using, and the condition of the cams, etc. Do not lose sight of the last mentioned point as that is very important, as you cannot set a machine when the cams are worn, as you could when they were new, as you cannot get the same results. In fact the office of the carrier is to deliver the yarn to the needles in such a way as may be necessary to knit it and not get drop stitches and holes. In order to do this, it must not be too high nor too low as it will drop and set too far away from the needles, or it will drop too close, and cut, so here they come thick and fast. Too far ahead, or too far back will all have the same effect. Set it so it will just clear the needles, and bear in mind the above mentioned causes, and if you will observe closely the relation of the yarn to the needles I think you will come out all right. If the bands

are loose or worn so as not to give tension enough, and especially if the cams are a little rough, they will cause drop stitches. The cams if ground too sharp will cut the butts off, and cause the needles to tip forward. This will cause drop stitches and holes, besides the breakage of needles.

There is another important thing that I will mention in connection with breaking needles, and that is the picks. These should be set so as to take the butt off the needle every time. Sometimes they will get out of place or worn, and in these cases do not get a good hold on the needle and will slip off and break them, and make bad narrowings. Of course this depends on the motion that operates them. They must be in good condition or they will not do their part, and one would experience the same bad results. If the picking arrangement is of the friction type, the friction should be set so as to give just friction enough to keep it steady.

It is necessary to have the picks throw the needles fully high enough, so they will land high enough to clear the guard cam, or they will come in contact with the end of this cam and break. When dressing the stitch cams be sure to get them both alike, or there will be produced cuts, pin holes in the narrowings, and no end of trouble. Nearly all knitters have gauges to go by. When they are ground to a gauge they are all right, if kept in shape. The tension must be adjusted according to the yarn one is using, etc., always quick and sensitive, just enough to keep the yarn well up in the needles and no more.

Before closing on this subject I wish to say a word on sinkers. It is not so important as it was a few years ago, as manufacturers of seamless machines understand this subject more fully now than formerly. There are a great variety of sinkers. The different kinds are adapted to different work. But what I wish to impress on the minds of the readers is that the methods employed in making and taking care of sinkers are not always just what they should be. In the first place, every sinker should be just alike, and should have a device to hold them, that will line every one so it shall be in proper position with the others. Some sinkers stand a little too far forward and some a little too far back, etc. When this is so, one cannot draw an even stitch on them, nor can one always get every stitch alike; as one sinker will stand so as to throw another off. This sort of thing will bother in the narrowings, in particular, by making pin holes and drop stitches.

To conclude, I will say that in order to get a good close seam in the heel and toe, the above mentioned things, as well as the cylinders, must stand square, and line up in every particular.

Another important thing for the fixer to bear in mind, when he cannot see just what is the matter with the machine, is to examine the parts that he thinks are causing the trouble and see if they are all right; as any lost motion will give no end of trouble.

I do not know as it is necessary to dwell on the seamless machine any longer, so will take up the looper.

The looper, though a comparatively simple little machine, will not make good work unless in good repair and in perfect time. To start with, see that the points are well divided and trued up, then time. The rule is, to have the table start just as the needles have left the points. That is, the points of the needles must be drawn back, off the points, and then commence to feed. By the time the needle has made its full motion, the table will have racked a tooth, and will then be in a positon for the needle to slide down the point to take up another stitch, and so on; providing the needles are the right distance to follow the motion of the machine, and the hook is properly set to take the stitch as it should. To set the hooks, have them just hard enough on the needles so they will not skip the stitches, not too high, nor too low.

When bending the hooks, always bend them in the full part of the circle, as otherwise the hook will not follow the motion of the machine and thus cause the latter to skip and bend the end of the hook just far enough to retain the thread, causing it to break. The tension must be properly adjusted. However, we leave this to your own judgment as this is controlled by the number of yarn you are using, its quality, etc.

The next thing in order is to see that the rough mending is well done and then the goods will go to the dye house, and as the methods employed there are according to the kind of goods made, and the process is always the same, or nearly so, I will not take up any time on this. Nor will I devote any time in the finishing room. Great care should be taken in getting out the goods so they will look as though they had been through competent hands.

Now I will just say a few words on system, and then will close.

Commence in the winding room and keep account of the amount of waste made each week and then repeat the same in the knitting room. Also keep an account of the needles. A very good way is to charge the knitters with so many needles each week, that is say, charge them say ½ cent for each needle and allow them so many, and if they use more than they are allowed charge them 1 cent for each needle. Carry this system all the way through the mill. Keep a record of everything that is done, so you can refer back and see just what has been done, and then you will always be in a position to dictate as to what is right as well as what is wrong. That is, if you have knitted a given number of dozens last week, and you have failed to produce the same this week, under the same conditions, it is well to know why. And the same is true in each and every little detail.

I do not know if it is necessary for me to illustrate any further, as every one ought to be able to establish a method that will be best adapted to his particular purpose.

After a good system is once well under way with some one who will see that it is respected, it will save more dollars than you are aware of, as well as having the satisfaction of knowing at all times just what you are doing and what you have been doing. For instance (in case you should change an overseer in any of the departments), after the new one is well under way you can see what you have lost or gained. In fact, you are up to date in all things pertaining to your business, and if you wish to make any money in it, this is just what you must do.

GAUGE.

Chats on Spring Needle Work.

I am a great believer in spring needles and think that too much cannot be said in their favor. They have to be kept in good order, however, to produce good work, and a fixer must know his business, for he only is responsible for the knitting. Take the Crane or Campbell & Clute machines, for instance. Start them up and take care of them properly and how long they will run. I have known Campbell & Clute frames which have been running for 15 years and which are as good as new today, but they have been well taken care of. These are large heads for knitting shirts and drawers, run with a 12-inch pulley on the frame and a 4-inch on the shaft, which gives 120 revolutions per minute. Some large buyers object to seams up the sides of nice Egyptian goods, so No. 20 heads give webbing wide enough to cut 38 or 40 size shirts that do not have to be stitched up the sides. All the cutter has to do is to lay the pattern on and slope the shoulders enough to fit in the sleeves.

In order to explain the proper adjustment of the machine, it may be worth while to explain the arrangement of the machines that I have in mind, which will answer as a type of this class. There are five burr wheels and four feeds on each head, two

wheels inside and three outside. The feed is the guide which leads the yarn into the loop wheel, and is set directly under it. This loop wheel has nicks in its blade. These nicks carry the yarn up under the beards of the needles, where it stays until it strikes the horn of the push back. Then it runs to the bottom of the needles to make room for another thread to come in on the beards of the needles. By this time the first stitch is getting to be over the beards of the needle at the landing wheel. The presser has pressed the beards of the needles enough to let the loop slip over and into place. The dividing wheel divides it and makes it look even, when finished. The knocking over wheel is also inside and finishes the stitch.

The loop wheel must be smooth and straight, and must enter the needles in the center. The blades of each burr wheel must go between the needles without touching and far enough in to see five blades, one-eighth of an inch on the inside; this would be on 33 gauge heads, having about nine stitches to the quarter-inch, or 36 to the inch. This is what we put in on No. 20 to 30 yarn, on spring needles.

Too much attention cannot be given to the landing wheel, for the reason the presser rubs on it occasionally and makes it rough. Then the knitter is having lots of trouble with her work, and does not know what the trouble is. She is running after the fixer. If he will first take off this wheel, examine it, he will find it a great help to him, for nine times out of ten it is this wheel that is doing the damage.

The side wheel is very important, and should be kept on every spring needle machine. Some fixers are apt to think they are of little value, and sometimes take them off. This is when he has some trouble with the head and has tried everything but the side wheel; he takes it off and starts the head and finds it will run all right. Then he leaves it off. The trouble is he didn't have it set right for the knitter.

Mercerized yarn is being used a great deal now, and it is a puzzler. We recently knit up some 2/40s, and it is very difficult to work this profitably. It's so hard, it keeps flying out from under the beards of the needles. We knit it right from the cone, and if the cones are not perfect, the per cent. of waste is so great that all the profit is lost. Two-forty mercerized yarn is expensive stuff; it is made from the best combed Peeler cotton obtainable, and for spinning alone it will cost upward of two cents per pound, and for coning not less than one cent more per pound. So it is very important that operatives on mercerized yarn be instructed how to handle it. Every bunch that runs in is going to break from 20 to 50 cents' worth of needles, to say nothing about the operative's and fixer's time.

Another thing that troubles the knitter is fine and coarse places caused by having one end catch on another, and running for five or ten yards.

A recent novelty in spring needle work which has taken well is vertical stripes made by a fancy presser. There are four pressers on a four-feed head, two of which do not press certain needles; they are left unpressed until they come around to the regular round presser. So you have two threads under the beards of certain needles all the time, which makes the vertical stripes.

PRESSER.

Stitches on Circular Ribbers.

Circular ribbers are divided in two classes: (A) those with a revolving cylinder and dial, and stationary bobbin stand and cam arrangements; (B) those with stationary cylinder and dial, and revolving bobbin stand, and cam arrangement.

The same stitches can be obtained on both classes of ribbers.

Experience has taught that ribbers belonging to class A are more adapted for making larger sized goods as shirts, drawers, underwear, etc., and ribbers belonging to class B are more

adapted for smaller sized articles as tops for hose, wristlets, leggings, mittens, etc.

Circulars belonging to class B can be run at a higher speed with less fear as to wear and tear, than the machines belonging to class A.

On an ordinary ribber five different stitches can be made: (1) plain stitch; (2) ½ cardigan or tuck stitch; (3) welt; (4) French imitation welt; and (5) a loose and coarse stitch.

A plain stitch and welt can be made on a one or more feed ribber, but the rest of the stitches can only be made by a two or more feed ribber. A plain stitch is made by having the cylinder and dial needles form a loop, and cast off on all needles as well in the cylinder as in the dial.

One-half cardigan, or tuck stitch, is made by having all needles form a plain stitch on one feed, but on the next feed the cylinder needles form a loop and cast off, but the dial needles form a loop and do not cast off.

On some ribbers the cam arrangements are made in such a manner that all cylinder and dial needles cast off, but on every second feed the centre cam in the dial does not allow the needles to come out far enough to let the old stitch slip over the catch of the needles, thus catching the new loop and the old stitch in the same hook.

A loose and coarse stitch is made by having one cylinder cam form larger loops on all the cylinder needles for one coarse.

RIBBER.

Gormly's Attachment for Spring Needle Machines.

This is an ingenious yet simple device which has undergone a series of practical tests in the knitting mills in Amsterdam, N. Y., and, we understand, with most satisfactory results. The inventor has applied mechanism to put in motion part of the Tompkins' knitter that has always been stationary; i. e., the circle to which the feed wheels are attached. By so doing he claims to get double production from every revolution of the cylinder. For instance, a machine was run on cop yarn 16 gauge, 20" cylinder, at the rate of 87 revolutions to the minute, but with this attachment a production equal to 174 revolutions of the old machine was obtained. The old frames are seldom speeded up faster than about 90 to the minute on account of the wear and tear. There is, of course, a limit to the speed of the knitting process; i. e., the forming of the stitch between the wheels and the needles. Mr. Gormly claims that with his attachment he is able to reach this limit without running the frame at a high and racking rate of speed.

Sizes of Men's Ribbed Underwear.

Editor Textile World:

Will you please send us the proper lengths and widths for men's cotton ribbed underwear, sizes 30 to 44? What we are after is the standard table that all manufacturers use.

J. C.

We do not think that there is any standard sizes, as much depends upon the gauze and the elasticity of the garment. We give, however, the following, made out by one that has been familiar with the knitting industry for a great many years, as being a safe guide to follow in the making of such goods:

MEN'S RIBBED SHIRTS.

Size.	Length.	Breast.	Sleeve.	Arm Size.	Cuffs.
34	32	28	19	8	3
36	33	28	19	8	3
38	34	30	20	8½	3
40	35	32	21	8½	3
42	36	34	22	9	3
44	36	36	23	9	3

MEN'S RIBBED DRAWERS.

Size.	Leg.	Front Rise.	Back Rise.
30	30	15	16
32	31	16	17
34	32	17	18
36	33	17	18
38	33	18	19
40	34	18	19
42	34	19	20
44	34	19	20

Skein Silk Dyeing.

Report of C. L. Auger to the Silk Association of America.

The skein silk dyeing branch of the silk industry has been undergoing a process of evolution during the past ten years, but the year 1898 is the year of the decade in which marked progress has been made in this country. Some few years ago, a successful skein silk dyeing establishment could be operated in a small way with a competent dyer at its head, but conditions have changed so that in these times a progressive, as well as a successful skein silk dyeing establishment is compelled to have a complete and perfect organization composed of a staff of chemists and dyers, all of whom are past masters in their several branches; the work being classified and divided into departments with competent chemists and dyers in charge; and last, but not least, an adequate supply of good water adapted for the purpose. These changed conditions have forced large establishments and expensive organizations upon the dyers, compelling them to devote all the time, energy and capital they can command to meet these requirements.

The dyers of this country have spared neither pains nor expense in arriving at a point of equality with the dyers of other countries. By skill, diligence and perseverance, they have succeeded in attaining a high standard in their work and organization. The application of the science of chemistry, with the ingenuity and mechanical resources of our dyers, has contributed largely to the achievement of success. European dyers are beginning to send some of their younger generation to our establishments; we are exchanging views across the water, and our mechanical and practical ideas are being investigated and copied. Of course, European dyers have special advantages in the lower cost of labor and the higher prices of dyeing, which our dyers offset by applying all the resources at their command, and it is only by the closest application of these that success can be attained.

We have some of the largest, responsible and most thoroughly equipped skein silk dyeing establishments in the world, which are in a position to dye all classes of work. Our dyers are devoting their time and skill toward arriving at perfection. They are abreast of the times, and produce work of the highest grade. Experience proves that linings and dress goods manufactured in this country and from silk dyed here wear fully as well, if not better, than the same silks dyed and woven in other countries.

While the dyer has been making rapid strides in the past, there is still much to accomplish. Skill, energy and capital will be necessary to keep the present establishments up to the times. New theories and difficult problems in dyeing present themselves daily, that require successful evolution, and as the demands of the silk industry increase and vary with fashion, the dyers will contribute their quota toward the requirements of these demands.

—A very important feature in the manufacture of cloth is to provide the weaver with a warp which is perfectly straight and open in every respect, not only because of the increased quantity of cloth which is obtained from the loom and the more permanent satisfaction thereby given to the operative weaver, but also on account of the quality of the work obtained. Every thread which is fast to its adjoining threads either pulls the threads when the rods are dividing them, or if they are badly intertwined a further breakage takes place.

—The American cotton bale has been a topic of discussion for some considerable time.

—One of the most common causes of troublesome warps is the use of yarns which are insufficiently sized for the strain and friction which they have to undergo.

SILK DEPARTMENT.

An Epoch in the Silk Industry of the United States.

Rumors of the formation of a silk-trust which have been floating in the air for many months past, have given food for thought to thousands of those engaged in that industry, and the question whether such a formation will be possible or not, has served as a basis to many heated arguments with the same unsatisfactory results such arguments usually have, namely, none.

Except those immediately interested in that gigantic undertaking, nobody will ever know the exact state of affairs until the deal is consummated or broken off, and consequently for outsiders or even newspaper reporters to assert that the trust will become a fact or not, seems to me very much like a guessing-contest, at the conclusion of which somebody will be enabled to say, "Well, I told you so," while the whole "rest" will shrug their shoulders and keep quiet.

Instead of arguing over that point, it would seem better, and it may also be wiser, to look, what many would call "the danger," straight into the face and try to figure out how labor, commercial and economic conditions would shape themselves if a silk trust were to become a fact today.

The word "trust" has been used in the national and state platforms of all political parties so often and with such good effects, that people have come to look upon it with the same disgust they bestow on those very same platforms, provided, of course, they are not politicians themselves. You mention the word "trust" to the laboring man, the artisan, or the small merchant, and instantly uprise in their minds faint memories of once read stories of the black plague with its hundreds of thousands of victims. For thus we see pictured in our patriotic comical papers Mr. Trust stalking along through some deserted factory street, either in the form of a dollar-inflated, bloated capitalist, or in the imaginary shape of the plague itself, carrying a scythe, a timeglass and a torch and looking as black and desperate as all well behaved black plagues, which have invaded the far East and the near East. Labor represented by the man with the paper cap, the man with the trowel and the man with the hammer, is lying prostrate at its feet, completing the happily conceived picture of ruin and despair.

Of course, this is all very funny, when taken as such, but unfortunately some people will take the kind of above described pictures seriously, and therefrom form their individual opinions of trusts, an opinion which, as can easily be imagined, will be none of the best.

But reverting to our Silk Trust, which we will suppose has become an accomplished fact, let us investigate the conditions of the industry, before and after its existence.

The silk industry in this country, dating back to about 50 years ago, was very slow in developing. While dragging along in an indifferent sort of way for 10 or 15 years, it was at that time taken seriously into hand by several enterprising, though poor Englishmen and Germans who, within the next 10 years, through hard work and excellent, far sighted business abilities, managed to accumulate a snug competency. The community having its eyes wide open (as communities always have) did not fail to notice the change in their neighbors' fortune and taking the hint went into the silk business "en mass" and with a rush, too.

This happened about the year 1885, whence really dates the great and rapid rise and consequent progress of the industry in this country. Skilled help being then scarce, wages were

for a short time enormously high, but it was not long before an influx of labor from the other side of the Atlantic brought them down to a reasonable level, which was still 200 to 300 per cent, higher than those paid in Europe. This difference in the price of labor made the struggle of the manufacturer for possession of some part of the home market a very hard one.

If it had not been for Yankee ingenuity, which went to work with a will, and in a very short lapse of time invented silk machinery of the most superior kind, and for a kind Providence which let both political parties see the necessity of protecting this particular industry, with almost the same eyes, there would be today no silk industry to speak of; for the difference in the price of labor is so great, that but few people outside of the manufacturer realize it fully.

It is an easily ascertained fact that with an average protection of over 50 per cent., the United States today imports about one-quarter of its silk-goods consumption from abroad. Not because the goods made here are inferior in workmanship, but in certain grades the domestics cost a trifle more than the imports, in spite of a 50 per cent. duty, that is, or at least is supposed to be collected on them.

I can not speak of the conditions in England, never having had an opportunity to judge for myself, but I have been actively engaged in the silk centres of France, Germany and Austria, where there are no silk trusts, and must say that the help there is so poorly paid and poverty stricken, so deeply steeped in misery and hunger, that even our comical papers, humorous as they might be, would recoil from an attempt to picture those really tragic conditions. It may be human nature that this very help after immigrating to this country forgets its past sufferings within a fortnight, joins a Union and sets up a howl for more wages. But if human nature is such a thing, I, for my part would prefer to be inhuman.

Below I give a list of average wages paid in silk mills in the state of New Jersey during the last year, which will show that the persons engaged in the silk business are making a fair living and are getting an equivalent for their work.

	Average help.	Very good help.	Male help.	Female help.	Both.
	From	To			
Quillers and doublers	$7	$10			
Winders	8	12			
Hand warpers	9	12			
Power warpers	16	20	*		
Ribbon weavers	20	25	*		
Knowles ribbon weavers	10	15			
Broad silk weavers	10	18			
Blockers	8	12			
Pickers	5	8			
Ribbon twisters	10	15			
Broad silk twisters	16.50	20			
Loomfixers	16.50	25			

* Mostly male.

At the present date there is no organization of the silk workers to speak of; frequent long strikes having exhausted the funds and unity of the divers Unions. It takes from one to two years to become a fairly good weaver or twister, but as most help come into the mill while young and work their way up, it takes them longer to acquire their special profession, though as a result they will be more expert in the end.

Silk requires, above all, honest, conscientious and skilled workmen or women, and this being the case, it can not be said that they are over paid. But taking into account the wages that other trades pay, considering the tendency of everything in this world to come down in cost or price, an inclination which no human wisdom, legislation or lung-power will ever stop, the silk operators are not badly off at all. The State of Pennsylvania recognizing the advantages of having in every respect such desirable wage-earners in their communities, has made within the last few years a tremendous effort to secure the location of silk mills within its borders, an effort in which many localities have been very successful.

These are the conditions as they exist today, from the workingmen's

standpoint. Looking at it from the manufacturer's point of view we will find competition to have grown so strong and keen, that in making calculations he has to take into account the smallest fractions of cents, if he does not want to be the loser in the end. Many years ago calculation used to be very simple and went something like this: One-third raw material, one-third labor and one-third profit. To-day, calculating in the same manner it would be: One-half raw material, one-half labor, and if there were four halves to a whole, it would be, one-half claims and one-half losses. So it is fortunate that a whole has but two halves after all.

Every producer of silk goods knows that to cut wages is to invite, firstly, inferior workmanship, and, secondly, the bad will of the employees, either of which is sufficient to upset any possible gain such a reduction might have in view.

The raw material being a very expensive one, the cost of which often fluctuates like sugar stock, the manufacturer who uses several thousand pounds of raw silk every week cannot carry too large a stock of it at any time, especially if he has to buy at an advancing figure. Thus if silk goes up $2.00 a pound, like it did within the last few months, the manufacturer will have to get better prices for his goods, or, failing in this, shut down his plant.

This of course throws all his employees out of work until he can either buy silk for less or sell his goods for more money. These conditions exist now. Though the country is prosperous and the demand for silk is plentiful, many mills are running on short hours, simply because the proprietor's stock of raw material bought at a reasonable figure has given out and he is unable to get prices for his goods which would permit him to buy at the prevailing figures.

Today the manufacturer is absolutely at the mercy of his costumers; the proceedings of some of which often come within an ace of being dishonest. The few who have originated the methods which I will describe below have unfortunately placed the vast majority of those who would not think of adopting them into a position where they either have to do so in spite of their own inclinations or go out of business.

For instance, a costumer will give an order,—a very large one—and thus secure for himself the very lowest price it is possible to make. After three or four weeks, when common everyday sense will tell him that work on his order must be under way in the mill, he will write a letter, politely informing you that he has made a miscalculation, and to his sorrow finds he cannot use as large a quantity as ordered. Therefore he begs you will kindly cancel one-half or two-thirds or three-fourths or fifteen-sixteenths of his original order.

Is it mere accident when he forgets to say, that having reduced his order he is willing to pay proportionally more for his goods? If the manufacturer's preparations have not gone too far he will at this point do well to put on a smiling face, do as he is requested to do and swallow his loss with good grace, for in the end he will be better off than if he took the other course, which would consist in replying that the preparations for filling the order had advanced too far and in consequence thereof he was unable to comply with the request. To this the merchant will say all right, but upon receiving his goods will find so many faults with them, and set up so many claims that the manufacturer's losses on this particular order will more than outweigh any profits he might have made thereon.

It must be borne in mind that nine-tenths of the silk business is done on order, where the customer will give you his own ideas, his own colors and his own designs. Manufacturing silk goods is not to be compared with manufacturing wall papers, which means that the first having to go through a great many more hands and processes,

they cannot be as absolutely perfect in their structure as the latter. So the customer will find fault with the color there, the design there, a little tiny spot there, a tight thread there and so on, and finally tell you, that unless you give him a reduction of so much, you are welcomed to take the goods back and keep them. Of course all the goods being made according to his own ideas, nobody else (for no two tastes are alike) will have much use for them, and that rather than have them lying around in your stock for a number of years, you will finally let him have the same at his own figure.

The manufacturer cannot go to law about these things, for not only would he lose his customers that way, but the frequency of the occurrence would necessitate the employment of several first-class law-firms during the whole year. Under such circumstances, the man who has received his goods uncomplainingly, and having paid full price for the same, is brought into most unfair competition, through no fault of the manufacturer, upon whom, howsoever, he will have to retaliate if he wants to keep up his own end. These are the conditions both employer and employee have to face today.

Now let us close our eyes and dream of a silk trust, a combination, which for reasons to be analyzed later on would at least be able to control the home market.

As the forming of the trust would not mean the concentrating of all concerns joining it, under one roof, I fail to see how much help or labor, from the highest to the lowest necessary for the management and running of a mill at the present date, could be dispensed with.

The first work of the trust would undoubtedly be to systematize the work of the mills, which would be done by having certain mills make certain classes of goods, exclusively. This move alone would mean a very considerable reduction in the cost of production. Would less help be needed then? Very unlikely, for the winders could not wind any more, nor the warpers warp any more, nor the weavers weave any more than they do now. The savings of the trust would then be made, not through saving of help, but by systematizing and centralizing the work.

It has been said in silk-circles, that to form a successful trust, the same would have to admit the cocoons; a remark which might be witty, but certainly is unlogical, for the trust as a body could buy the needed raw material right in Japan or Italy (as many large mills do now) instead of buying of silk brokers, which would effect another large saving.

The trust would also abolish the commission merchant, who acts as a kind of a pawnbroker to the small manufacturer, and who until now has been considered an inevitable evil, and finally make the above described "shrewd and smart" dealings of the customers themselves an impossibility.

Would this advance the retail selling price of silk goods? Would your wife have to pay more for a dress or you more for a necktie, than you do now? There is no earthly reason why this should be so, especially as European competition will still continue and keep the trust from getting too hilarious.

A trust would pay the same rate of wages to all its employees, whether they be in Connecticut, Pennsylvania or New Jersey. This rate would not be lowered, because savings, which cannot be accomplished now and sometimes have to be effected out of the workingman's pay (if the manufacturer wants to keep his mill running and his trained help together) could then be made in many different ways. I have but little doubt that after a few months of trust management, wages would be increased the same as they have been in many industries, which lately have come under the control of trusts.

These are both sides of the question. Whether the trust will be launched or not, is beyond us to tell or know, but

we can in advance judge of the effects such a change will have on the industry in which many thousands of us have been diligently engaged for many years.

It is all our desire and interest to see the silk industry of the United States increase, to witness its gain of strength and to watch it get control of the market that by right belongs to it. Further than that we will not wish for the present, though we can see in the distant future, when instead of importing, our silk goods will be exported to all quarters of the globe; and if a trust will hasten this progress as I sincerely believe it will, then I say with all my heart—let it come.

E. F. F.

The Manufacture of Silk.

As is well known, the silk industry in this country has increased very rapidly during the past ten years.

Although the manufacture of silk goods is so largely on the increase, the actual nature of the silk and the best methods of treating it in order to obtain the very best possible results, seem to be but very imperfectly understood by many of those actually engaged, not only in making a living by its manufacture, but by some who are rapidly growing rich out of it.

The raw material which is in most general use amongst silk manufacturers is Italian, Japan and China.

Italian silk is used very extensively for warps on account of its superior strength, elasticity and evenness in the thread.

The better qualities of Japan silk are also in demand for warp purposes, as well as making a very superior quality of filling or weft; while China silk may be said to find a place chiefly as filling, although some mills use it extensively for warps in certain grades of goods.

There is one particular grade of China silk which may be taken as an exception to this general rule, and this is what is known as "steam China filature," which makes very excellent organzine.

It would perhaps not be out of place to give a short account of the general methods in use by those who are actively engaged in the preparation or first process of manufacture.

The cocoons are first placed in hot water 150° F. to 170° F., in what we may term the reeling basin, and after being allowed to soak until sufficiently soft, the waste which always exists on the outside of the cocoons is gently removed with a small brush, and when this waste has been removed the reelable ends will be found attached to the brush.

When the reelable ends of a number of cocoons have been found (varying according to the size of the raw silk thread required, say from four to twelve fibres) they are passed together through a perforated guide which is situated directly above the reeling basin, thence up and over a glass pulley some three feet above the guide eye, and from there down and under a second pulley directly under the first one. Then they are twisted from six to twelve times round and upon themselves; and next passed up and through the upper porcelain eye, through the reel guide and on to the reel.

The reason for the thread passing several times around itself is to straighten out all the kinks which may be in the several fibres and which would detract from the marketable value of the silk. It also gives a very even tension to the thread which is necessary to the proper winding of the same.

After the silk has been reeled into hanks, as described, it is next classified both as to its size and grade or quality.

The very best and evenest thread is known as "extra classical;" the second grade as "classical;" the third grade "filature;" and the lowest as a "re-reel."

The quality of the silk itself in these two lower grades is very often of a very good quality so far as its

strength and lustre are concerned, but it has to be classified in the lower grades on account of the unevenness in the thread, which is usually caused by a number of strands in the thread constantly varying.

This silk thread as it leaves the reel is known to commerce as raw silk and must be graded and classified into either one or another of the above mentioned four qualities.

The extra classical will of course be the thread which is almost free from nibs or broken strands or badly attached filaments. The various sizes or thickness of these silk threads are specified by what is known as the denier system, which system will be fully explained in a later article.

DOUGLAS ELLIS.

Spun Silk.

Spun silk is shoddy silk, and is the re-manufacture, in part, of waste silk, in the manufacture of silk goods, and is also obtained from pierced cocoons. Silk worm eggs are about the size of a pin head, and under a high temperature, are hatched out; the worms being, at first, about a sixteenth of an inch in length, growing, in stages, to the size of a person's finger. When full worms, they encircle themselves with a thread, from 800 to 1200 yards in length, remaining a short time therein, then emerging in the form of large moths. The males die upon reaching maturity, while the females die after laying from 200 to 700 eggs.

The moths, to escape from the cocoons, eat a passage through the end thereof, so that instead of a continuous thread, the cocoons have a large number of short threads, which, in order to be used for fabrics, require to be carded and spun, similar to wool and cotton shoddy.

As in the case of shoddy, wool and cotton, a thread of even thickness and fineness cannot be produced from silk in this condition; and, on account of the numerous short lengths of fibres caused by breaking up the waste silk, and the pierced cocoons, a much greater amount of twist per inch must be put in, causing a greater degree of harshness in the yarn. Spun silk is counted the same as cotton; the number of yards to the pound denoting the counts.

One of the principal things for which spun silk has been, and is, used, is producing fabrics for decorative purposes, such as furniture covering, curtains, table covers, and wall hangings. The lustre which can be given to, and retained in, the goods thus made, renders the material very serviceable for the purpose, and the elasticity of the silk enables rich and otherwise difficult patterns to be formed. The facility with which other fibres can be added with it, makes the silk capable of comprehensive uses.

Fabrics woven with a body of cotton and face of spun silk, possess the qualities of weight and good appearance, so requisite to meet a ready sale, at low, but remunerative prices. The art of designing is called into requisition for these goods, for manipulating the various weaves of grounds, and binders to produce the best effect, with the least waste.

To illustrate, let us consider a fabric in which the warp is spun silk of fine counts, with regular silk filling for face figures, of several colors, to be shown at intervals with considerable space between. Suppose the ground is spun silk satin, with cotton backing, and the goods 52 inches wide. The figure might be a running design, with four colors, called on alternate picks. The amount of silk consumed would make the goods expensive in their production, without any visible cause, as the amount of silk hid in the ground would be an unnecessary waste, both to the producer and to the consumer, while, if the patterns were arranged to have the silk filling thrown in, where needed, the cost of production would be kept comparatively low, without sacrificing the appearance or feel of goods produced.

At a time when the writer was engaged in making spun silk fabrics,

there was obtained an imported sample, for the production of which, yarn was ordered, as well as harness and reeds, and instructions given what to make with the material supplied. The fabric was termed Russian satin, double face, 175 threads to the inch, 90 picks, 52 inches wide. Warp some 500 yards was made, entered into harness and reed, placed in the loom, and started. For the first yard, everything went nicely, after sufficient tension had been got on warp to get the picks in, but then a trouble arose which was never overcome. The manager could not understand it. The goods were being made by the thousands of yards on the other side of the water. They had been to some trouble to get as near as possible to the right counts of spun silk, and of the best quality, and the machinery was of the best. Why could the goods not be made?

Ordinarily, the best of short fibre yarns will produce more or less of a fluff, but, in this case, the fluff would form between the reed and harness and form in knots on the warp threads, which, as the reed engaged them, would break out the warp threads, or become fast together, causing floats, or the throwing out of the shuttle. The shedding motion was an open-shed side-dobby. For the purpose of forming the double face, 16 shafts are used, eight for the bottom satin, and eight for the top satin (14 shafts would have done as well), to make a double satin seven and one.

The open shed caused seven of the harnesses to hold the warp therein, at the bottom of the reed, and the same number of threads at the top. It is well known that the dents of the reed are much less flexible at the top and bottom than in the middle, so that, at least, a part of the cause of the trouble was in the nature of shedding motion used.

In breaking up the silk waste material of previous manufacture, to be re-spun, there are unavoidably left motes of fibres, which afterward become embodied into the yarn. In the loom, the yarn rubs in the harness and reel some 500 or more times, disengaging the motes in the form of fluff at the back of the reed, preventing a good shed being formed in the work.

Spun silk that will weave well in a jacquard harness has been found impossible to weave in a shaft harness. It may, therefore, be inferred that a process of rebeaming after warping, with the tension and fluff removed, would well repay for the trouble and time expended.

CAMPBELL.

Machine for Mercerizing.

A Swiss has recently taken out a patent in the United States for a machine for impregnating yarns and threads with caustic liquids in a uniform manner, and in such a way that the operatives are not in any way liable to the danger of coming in contact with the caustic liquid. It is stated that this machine possesses certain advantages, among which may be mentioned that it affords the operatives perfect security against injury by the caustic lyes and renders the expensive and inconvenient working with caoutchouc gloves unnecessary, and enables a perfectly uniform impregnation to be effected, as the yarns are made to pass through the liquid in a uniformly spread-out condition.

—Extraneous but keenly operative forces more or less affect progress in designing and manufacturing.

—Novelty of style is as important in textiles as in all manufactured productions in which the decorative arts are practiced.

—Of the two kinds of waste made during the spinning of yarn and the weaving of cloth in cotton manufacture, the softer kinds are very often opened out and returned to the ordinary mixing.

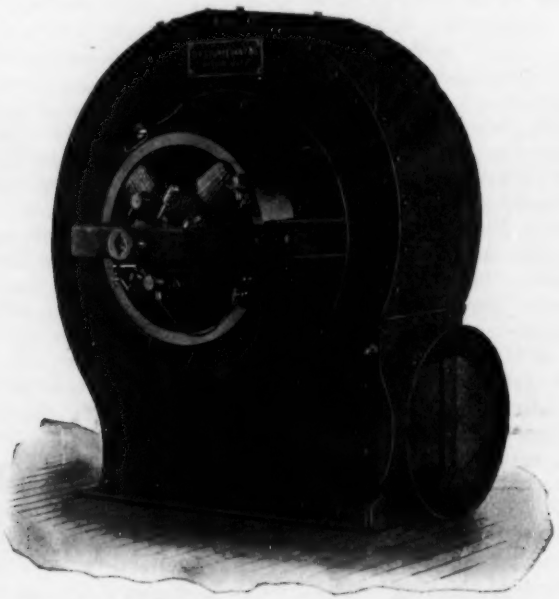
—As time goes along greater efforts are made in all directions to utilize what have hitherto been considered worthless by-products.

POWER DEPARTMENT

ELECTRICITY—STEAM—WATER.

New Steel Plate Electric Fans.

In the accompanying illustration is shown a new type of electric fan, designed and constructed by the B. F. Sturtevant Co. of Boston. The fan itself is of the construction usual with Sturtevant blowers and exhausters, in this case it being that of an exhauster, and provided with an inlet upon the side farthest from the motor.



The circular cast iron plate which is attached to the fan side carries three projecting lugs, which in turn centre and support the magnet ring of the motor. This ring which is of wrought iron, carries four pole pieces of the same material. The armature is of the barrel wound type, provided with a cast iron flange bolted to its supporting spider at each end of the core. This flange forms a support as well as a cylindrical receptacle for the projecting ends of the coils.

Between the laminae of the core special constructed vanes are provided which permit of the passage of air, and hence of thorough ventilation when the armature is turning and acting in the capacity of a blower.

The smooth interior of the armature flange offers no opportunity for the collection of oil or dust.

The armature shaft is supported in ring oiler bearings formed in the ends of the yokes. The brushes are of fibre graphite, carried by reaction brush holders.

This type of motor was designed to meet specific conditions which limit the temperature rise to 90 degrees F. after a full load run of ten hours, and which insure absolutely sparkless operation under all changes of load from no load to 25 per cent. overload.

Exhaust Steam Heat.

The heat of exhaust steam, after warming feed water, is many times greater than the power lost in engine by a moderate back pressure used to force exhaust through heating system.

The fact remains, however, that in many plants heating with exhaust steam, back pressures of five and even ten pounds are sometimes found; and in addition the back pressure on engine varies by more than 100 per cent. on different days or times of the same day, to which trouble is added unsatisfactory results from parts of the heating surface, and sometimes injury to the boiler through the lodgment of grease from the engine cylinder.

With a properly arranged system for heating with exhaust steam the back pressure on the engine need not be more than two pounds above the atmosphere, the variation of back pressure can be kept within a fraction of a pound and the grease escaping to the heating system and boiler so reduced in amount as to cause no trouble.

The demands on an engine for power are not constant throughout the day, and the steam condensed by the heating system varies with the outside temperature. Both of these causes tend to produce changes of pressure in the heating system, to an extent beyond which a back-pressure valve can regulate.

To reduce fluctuation in pressure due to irregular action of engine and heating systems the engine exhaust should run directly to a reservoir having from forty to fifty times the capacity of engine cylinder.

This reservoir, shown at S in the drawing should be provided with means to extract the oil from exhaust steam, and the size of reservoir is an important factor for this purpose.

Various devices are employed in the reservoir to extract grease from the steam, but their success depends in a high degree on a large reservoir capacity, as it is very hard to extract grease from the steam while it is moving at a high velocity.

Having a reservoir of sufficient capacity to compensate for fluctuations in exhaust, and condensation by heating surface, the back pressure for flow of given quantity of steam depends on the resistance of exhaust piping and heating system.

Resistance of a piping system depends on its length, the diameter of pipe and number of turns or elbows.

As these factors vary in each plant no exact sizes of exhaust piping, for given horse power of engine can be given until conditions are known.

Simple engines in common use take from 25 to 40 pounds of steam per horse power hour, so that piping in each case should be based on the amount of steam rather than the size of engine.

After the exhaust steam passes through the reservoir and grease separator at S it enters the main pipe M, and thence to the feed water heater H, the heating system or both.

Only about one-fifth the exhaust steam is required to heat feed water, and as the heater usually offers considerable resistance, relatively speaking, it is unwise to force all the steam through it.

By adjustment of the valve at X, enough steam will go to heater for feed water and the remainder through M to the heating system.

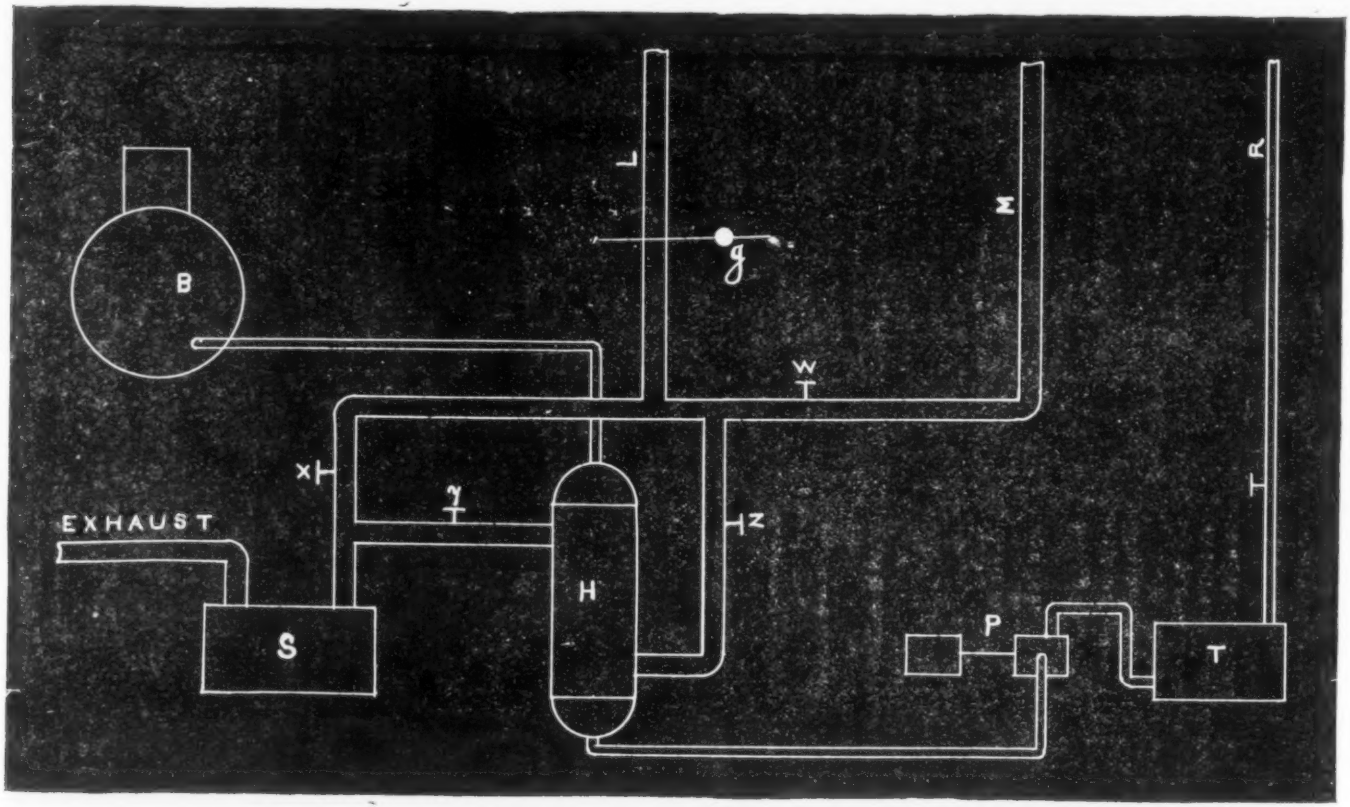
If all the exhaust steam is at any time required for the heating system, valves at Y and Z may be closed, thus shutting steam out of the feed water heater.

When steam heat is on, the entire quantity of exhaust may not be required at all times, pressure will thus be slightly raised so as to open the back pressure valve at g and allow extra steam to escape to roof.

The valve g should, of course, be set for the pressure it is desired to maintain in the heating system.

In summer, or when heat is not required, the valve at W should be closed and the weight on back pres-

(Continued on page 97.)


B
L
g
M
R
W
X
Y
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EXHAUST
S
H
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T

(Continued from page 95.)

sure valve g placed on the other end of arm so as to hold the valve open.

When heating surface is in use steam passes through the main M to the top of building, thence down the distribution pipes to the heating surface, where it condenses to water and drips through the return pipe R to the tank T. From tank T the water of condensation is returned by the pump P through the heater H or by other means such as gravity traps to the boiler B.

The valve of pump P is usually controlled by a float in the tank, so that the speed of pump is regulated by the amount of water returned to tank.

Practical Electricity.

A. D. ADAMS.

DYNAMO CONSTRUCTION.

Having considered the general magnetic properties of iron in its several forms, the second class of dynamo materials, which form the electric conductors, is to be taken up.

The armature winding, magnet coils and commutator segments in electrical machinery are made of copper with practically no exception.

When an electric pressure is set up in any conductor, as a wire moving past the pole of an electro-magnet, an electric current flames through the conductor, its ends being joined, and the strength or volume of this current, for a given electric pressure, depends on what is termed the electric resistance of the conductor.

This electric resistance is a property inherent in the metal of which the conductor is made, depending also on the conductor's length and the area of its cross section.

Electric resistance remains the same for any given conductor so long as its temperature is constant, no matter how great the electric pressure and current in it.

The wire commonly selected for comparison of resistance is round in section, one foot long and 0.001 inch in diameter, the resistance of this wire of any metal is called the specific resistance of that metal.

The specific resistances of some of the metals are given in the following table:

Resistance of wire 1 foot long and .001 inch diameter.

	Ohms.		
Copper	9.59	Silver	9.59
Gold	12.52	German Silver	127.32
Platinum	59.10	Aluminum	17.72
Nickel	75 78	Mercury	578.60
Iron	59 0	Zinc	34.22
Tin	80.36	Lead	119.39

Inspection of this table shows that the only cheap metals with resistances anywhere near that of copper to be iron and zinc.

Dividing 9.59 into 59.10 gives the

COMPARATIVE SIZES OF WIRE.

ratio of iron resistance to that of copper as 6.16 to 1, and dividing 9.59 into 34.22 gives the ratio of zinc resistance to that of copper as 3.56 to 1.

The resistance of any conductor depends on its material and varies directly with the length and inversely as the cross section.

The Ohms resistance in a conductor of any material may be found from the expression:

$$\text{Ohms} = (L \div A)\, S$$

in which

L = length of conductor in feet.

A = square of diameter taken in thousandths of an inch.

S = Ohms in wire 1 foot long 0.001 inch diameter.

From the resistance ratios of iron and zinc wire, either the iron or zinc evident that for a given length a wire of zinc must have area 3.56 times, and a wire of iron 6.16 times that of a copper wire of the same resistance.

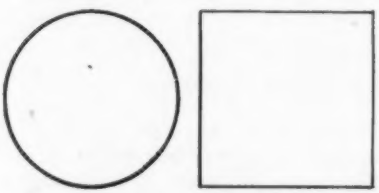
To illustrate the increase in size of zinc and iron wires over those of copper for the same resistance the following cross sections of wires having the same resistance are shown, the copper is one-quarter, the zinc fif-

teen thirty-seconds, and the iron five-eighths inch in diameter.

Reference to the tables giving sizes and resistances of wires will show that the area of wire is usually given in what are called circular mils, and it is well to note the exact meaning of this term.

For convenience in stating the diameters and areas of wires the mil, equal to one thousandth part of an inch is taken for the unit of length, and diameters of wires are stated in this unit, for example No. 10 B. and S. gauge has diameter of 101.89 mils, while if the inch be taken as unity the diameter will be stated as 0.10189 inches, which is not so convenient to work with.

The areas of wires are indicated by the square of the diameter in mils, the result being called circular mils, thus squaring above diameter in



RELATION CIRCULAR MILLS TO AREA.

mils of a number 10 wire its circular mils are found to be 10381.

A wire of one mil diameter has its area represented by $(1)^2 = 1$. circular mil, and the actual area of this wire in square mils is evidently $1. \times 0.7854 = 0.7854$ square mils.

The circular mils of a round wire represent then the actual area of a square wire whose sides would just inscribe the circle presented by a section of the round wire.

The relation of circular mils to area may be well illustrated by the following drawing of a round rod one inch in diameter and a square rod with each side one inch long, so that the square will just inscribe the circle:

Taking dimensions in mils, the round rod has a diameter of 1000 mils, its circular mils or diameter squared are 1,000,000, while its actual area in square mils is $1{,}000{,}000 \times 0.7854 = 785{,}400$ square mils.

The area of the square rod is $1000 \times 1000 = 1{,}000{,}000$ square mils.

In the table of specific resistances given above the figures were based on chemically pure metals, so that as found on the market somewhat higher figures must be used.

A safe value for the specific resistance of copper for the ordinary range of temperatures may be taken as 11 Ohms per mill foot.

The formula above given for the resistance of a copper wire of any length and area therefore becomes for a round wire

$\text{Ohms} = (L \div A)\ 11.$

For a square wire, or rod of any section having known area in square mils the formula becomes

$\text{Ohms} = (L \div A)\ 8.64.$

Because the resistance of a copper wire one foot long and one square mill in area is 8.64 Ohms.

The formulas can be applied to any other metal by substituting the proper values for specific resistances.

A Successful Boiler Treatment.

Every user of the steam boiler is well aware of the danger that exists in the formation of scale and the value of a compound that prevents it or effects its removal. The subject has received the attention of scientific men for years, and has been liberally discussed in trade journals. The formation of scale or incrustation, as it is generally known, is due to the presence of mineral substances in the water, the most common of which are carbonate of lime and magnesia. The crust that forms on the inside of the boiler sometimes attains the thickness of over an inch. Its most objectionable feature is that it forms a highly non-conductive body between the iron and the water, resulting in an enormous waste of fuel. Practical engineers estimate that the presence of one-sixteenth of an inch causes the loss of 15 per cent. of fuel; one-fourth of an inch of scale causes a loss of over 38 per cent. of fuel, and one-half inch of scale

causes a loss of over 60 per cent. of fuel.

There are compounds possessing points of excellence, but none, that we know of, which has given more satisfaction than that known as "boilerine," manufactured by Straus & Co., 55 Broad Street, New York, N. Y., which has been on the market for over twenty-five years.

It has received the indorsement of prominent engineers and chemists in this and foreign countries, and maintains its popularity. The claims for it are well sustained for removing old and preventing new incrustation from either salt or fresh water, eliminating all foreign substances held in solution as a soft insoluble sludge, keeping the heating surface absolutely clean from incrustation, and effecting, of course, a material saving in the consumption of fuel. It has been thoroughly tested, and is in continuous use in many plants. Its efficacy has been settled by practical experience. It is in no way injurious to the boiler plates or other metals, as it is entirely free from acid; is colorless, tasteless and odorless; therefore especially adapted for ice factories, breweries and where live steam is used, its action being only to decompose the incrusting salts and prevent corrosion.

Those who are interested in the preservation of boilers, the reduction of risk from explosion and the saving of fuel will find that the treatment meets all requirements.

L. & C.

The American Woolen Company.

The principal office of the American Woolen Company is located in the Ames Building, Boston, and all matters relating to the management of the combine is conducted at that place.

The combine will carry an insurance of $40,000,000 and the risks will be placed in stock companies.

The permanent organization of the company is as follows:

President, Frederick Ayer, Lowell; vice-president, Joseph G. Ray, Franklin; treasurer, William M. Wood, Andover; assistant treasurer, Edward P. Chapin, Boston; secretary, Joseph T. Shaw, Boston; executive board, William M. Wood, chairman, Andover; Charles Fletcher, Providence, R. I.; James Phillips, Jr., Boston; directors, Frederick Ayer, Lowell; Joseph G. Ray, Franklin; William M. Wood, Andover; Charles Fletcher, Providence, R. I.; James Phillips, Jr., Boston; Edwin C. Swift, Boston; J. C. Woodhull, Newark, N. J.; Edward P. Chapin, Andover; Joseph E. Fletcher, Bristol, R. I.; Frederick H. Prince, Boston.

The following mills, known as the associated plants, are at present included in the company:

Washington Mills of Lawrence, National and Providence of Providence, Beoli and Fitchburg Worsted Mills of Fitchburg, Riverside Mills of Providence, Valley Worsted Mills of Providence, Fulton Worsted Mills of Fulton, N. Y., Saranac Mills of Blackstone.

These mills will have added to them the following, to be known as the acquired plants:

Ray Woolen Mills, Franklin; Taft, Weeden & Co. Mills, Providence; Assabet Mills, Maynard; Sawyer Mills, Dover, N. H.; George E. Whitney Mills, Enfield, N. H.; Vassalboro Mill, Vassalboro, Me.; Kennebec Mill, Fairfield, Me.; Brown Manufacturing Company, Dover, Me.; Chase Mills, Webster; Faulkner Mills, Lowell; Collins Mill, Collinsville; Milner Mills, Moosup, Conn.; Sheffield Mills (John T. Fiske & Co.), Pascoag, R. I.; Manton Mills, Manton, R. I.; Inman Mills, Harrisville, R. I.; Lewis Anderson Company Mills, Skowhegan, Me.

Other plants are under consideration and examination.

L. & C.

—A consideration of the chemical properties of the wool fibre will show how difficult it is, compared with vegetable fibres, to effectually cleanse and bleach wool without injuring the fibres, for we are restricted practically to the use of weak solutions of detergents, and the use of these at low temperatures.

DYEING DEPARTMENT.

Dye Recipes for July.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $3.

RECIPE NO. 97.

Orange Yellow on Cotton Cloth.

Direct Yellow T on 100 pounds of cotton cloth.

Prepare dye bath with

20 lbs. Common Salt.
2 lbs. Direct Yellow T.
(A. Klipstein & Co., 122 Pearl St., New York.)

Introduce material into this bath at about 100 degrees, bring to a boil, and dye at this temperature for one hour.

Direct Yellow T can be dyed on cotton or wool separately, but does not do as well on mixed goods.

On cotton yarn it is very fast to light, and on wool is fast both to light and milling.

RECIPE NO. 98.

Blue on Cotton Yarn.

Diphenyl Blue R R on 100 pounds of cotton yarn.

Prepare bath with

20 lbs. Common Salt.
3 lbs. Diphenyl Blue R R.
(John J. Keller & Co., 104-106 Murray St., New York.)

Enter yarn at boil and dye at this temperature for one hour with sufficient turning to insure even dyeing.

Diphenyl Blue R R gives a blue similar to Diphenyl Blue B (Recipe 82), but of a redder or more violet tone.

If the dye bath is used over again, the same shade may be obtained with a smaller amount of dyestuff.

RECIPE NO. 99.

Brown on Cotton Yarn.

Benzo Chrome Brown B S on 100 pounds of cotton yarn.

Prepare the bath with

20 lbs. Glauber's Salt.
1 lb. Soda Ash.
4 lbs. Benzo Chrome Brown B S.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)

The yarn is dyed for one hour at the boiling temperature with constant working. The volume of the dye bath should be kept as small as possible.

The accompanying sample was after treated in a bath made up with

2 lbs. of Bichromate of Potash.
3 lbs. of Copper Sulphate.

The yarn is then worked in the bath for one-half hour at a boil.

The shades produced by the after treatment have not the depth of those in which this treatment is omitted, but they are much faster to light and washing.

Only ⅓ the amount of dyestuff and only ⅓ the amount of the other ingredients need be added for a second dyeing in the same bath.

Benzo Chrome Brown B S will be found particularly fast to acids.

RECIPE NO. 100.

Black on Woolen Cloth.

Nerol B on 100 pounds of woolen cloth.

Prepare dye bath with

10 lbs. Glauber's Salt.
3 to 6 lbs. Acetic Acid 9 degrees Tw. (According to hardness of water).

Boil. Cool the bath down to about 190 degrees and add

5 lbs. Nerol B.
Previously dissolved in water.
(Berlin Aniline Works, 72 Front St., New York.)

The goods are now entered, the bath brought to a boil, and the material dyed at this temperature until the bath is exhausted.

The black produced in this manner has an extraordinary fastness to

washing, thus rendering it valuable for knitting yarns, hosiery, flannels and any goods which have to stand a severe washing.

RECIPE NO. 101.

Turquoise Blue on Woolen Cloth.

New Patent Blue G A on 100 pounds woolen cloth.

Prepare the dye bath with

20 lbs. Glauber's Salt.
3 lbs. Sulphuric Acid.
1 lb. New Patent Blue G A.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)

and dye at boiling temperature for one hour.

New Patent Blue G A exhausts well, possesses a very high coloring power, and gives a brilliant shade.

It compares very favorably with other dyestuffs of this nature, as to fastness to light, alkalies and milling.

It is especially recommended for the level dyeing of fancy shades on ladies' dress goods and yarn, and owing to its fastness to milling may be used in combination with alizarin colors.

RECIPE NO. 102.

Dark Brown on Cotton Yarn.

Nitrazol Brown B on 100 pounds of cotton yarn.

Prepare dye bath with

20 lbs. Glauber's Salt.
2 lbs. Soda.
3 lbs. Nitrazol Brown B.
(Wm. J. Matheson & Co., Ltd., 183 Front St., New York.)

Dye at a boil for one hour with constant working.

After dyeing the material is coupled in a fresh, cold bath of

Nitrazol C or with

Paranitraniline C.

The accompanying sample was coupled as follows:

For 100 pounds of goods, the cold bath is charged with

6 lbs. Nitrazol C Pat.
1¼ lbs. Soda Ash, previously dissolved.
10 oz. Sodium Acetate, previously dissolved.

After stirring the whole for a short time, enter the goods and work 20 to 30 minutes, then rinse and soap.

For lighter shades the quantity of Nitrazol C and sodium acetate may be diminished in the same proportion as the dyestuff. (See Recipe No. 105 this issue.)

RECIPE NO. 103.

Green on Cotton Yarn.

Direct Green B C on 100 pounds cotton yarn.

Prepare dye bath with

3 lbs. Direct Green B C.
(The Stone & Ware Co., 157 Maiden Lane, New York.)
10 lbs. Salt.

Enter in yarn at boil and turn one hour at that heat. Use less color for standing kettles.

Direct Green B C gives a full shade of color with 3 pounds dyeing. The color works level and goes on slowly on the fibre, and is well adapted for cotton dyeing. (See Recipe 71 in May issue.)

RECIPE NO. 104.

Blue on Cotton Yarn.

Blue L I O on 100 lbs. of cotton yarn.

Prepare the dye bath with

3 lbs. Blue L I O.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)
20-25 lbs. Common Salt.

Introduce yarn a little below the boil, raise slowly to the boil and dye at this temperature for one hour.

The above amount is for the first bath. If used a second time these amounts may be diminished considerably.

Blue L I O penetrates the fibre thoroughly and evenly and is fast to washing. It gives a brilliant shade of blue, which in some respect resembles a Prussian blue.

RECIPE NO. 105.

Brown on Cotton Yarn.

Nitrazol Brown G on 100 pounds of cotton yarn.

Prepare bath with

20 lbs. Glauber's Salt.
2 lbs. Soda.

3 lbs. Nitrazol Brown G.
(Wm. J. Matheson & Co., Ltd., 181 Front St., New York.)

Dye at a boil for one hour, with constant working.

After dyeing, the material is coupled in a fresh cold bath of

Nitrazol C,

or with

Paranitraniline.

The accompanying sample was coupled as follows:

For 100 pounds of goods, the cold bath is charged with

6 lbs. Nitrazol C.
1½ lbs Soda Ash, previously dissolved.
10 oz. Sodium Acetate, previously dissolved.

After stirring the whole for a short time, enter the goods and work 20 to 30 minutes. Rinse and soap.

For lighter shades the quantities of Nitrazol C and Sodium Acetate may be diminished in the same proportion as is the dyestuff.

Nitrazol Brown G will be found very fast to washing, does not bleed, and is comparatively fast to light and acid.

For producing browns fast to washing on raw cotton and yarn, this color is of interest, as it can be dyed at a low cost.

Nitrazol Brown G may be coupled with many of the diamine colors. For further information in regard to which see W. J. Matheson & Co.'s pamphlet entitled A New Developing Process for Diamine Colors. (See Recipe No. 102, this issue.)

RECIPE NO. 106.

Blue on Cotton Yarn.

Vidaline Blue 5 B on 100 pounds of cotton yarn.

Prepare the dye bath with

3 lbs. Vidaline Blue 5 B.
(Sykes & Street, 85 Water St., New York.)
25 lbs. Common Salt.

Enter yarn at a boil and turn for one hour at that temperature, then shut off the steam and turn for one-half hour longer while the bath cools.

Vidaline Blue 5 B, like the other Vidaline Blues, is comparatively fast to light and washing.

A subsequent passage through 5 pounds of copper sulphate at a boil for 20 to 30 minutes makes them still faster, and gives greener shades.

Vidaline Blue 5 B also dyes cotton and wool mixed goods, the same shade in one bath.

RECIPE NO. 107.

Red on Cotton Yarn.

Direct Fast Red 4 B on 100 lbs. cotton yarn.

For dyeing 100 lbs. of yarn, prepare the bath as follows:

5 lbs. Direct Fast Red 4 B.
(O. S. Janney & Co., 8-10 Letitia St., Philadelphia, Pa.)

dissolved in 50 gallons of boiling water, with the addition of

2 gal. of Caustic Soda Lye

(made by dissolving 27 lbs. of Caustic Soda in 10 gallons of water.)

When the dyestuff has dissolved and the caustic soda has been added, stir into the dye bath

150 lbs. of common salt,

until completely dissolved, and then add enough water to bring the bath up to 100 gallons.

Dye the yarn for ½-hour at temperature of 180°, wash until wash water is no longer colored and then add to the last wash water,

½ pint of Sulphuric Acid,

or better still,

2 lbs. of Alum.

The dye bath must always be kept up to this strength, and subsequent lots require but

3 lbs. of Direct Red 4 B
1 quart Caustic Soda solution as above.

The dye bath should be kept up to the same number of degrees of hydrometer, by the addition of small amounts of salt.

Direct Fast Red 4 B is fast against acid. Exceedingly fast to light and washing and very fast against scouring, alkalies and laundry bleaching. It gives a fiery scarlet shade, the brilliancy of which depending largely

upon the washing after dyeing. It is absolutely necessary that the yarn be washed continuously in cold water until the water is no longer colored, otherwise dull shades will be produced, and the color will not be fast to washing or rubbing.

Direct Fast Red 4 B is particularly desirable in the manufacture of high grade damasks, ginghams, dress goods, etc.

RECIPE NO. 108.

Green on Cotton Yarn.

Diphenyl Green G on 100 pounds of cotton yarn.

Prepare the bath with

20 lbs. Common Salt.
3 lbs. Diphenyl Green G.
(John J. Keller, 104-106 Murray St., New York.)

Enter yarn at boil, and dye at that temperature for one hour with sufficient turning to insure even dyeing.

Diphenyl Green has a high coloring power, and goes on the fibre evenly. If the dye bath is used over again the same shade may be produced with a smaller amount of the dyestuff.

RECIPE NO. 109.

Green on Woolen Cloth.

The Amend Mordanting Process for 100 lbs. of Woolen Cloth.

(Controlled by the Amend Process Co., 205-211 Third Ave, New York.)

Prepare bath for mordanting with

6 lbs. Acetic Acid 30 per cent.

Work the cloth one-half hour at 140 degrees F., lift the material from the bath (unless the dyeing machine is so constructed that additions may be made to the bath without danger of uneven dyeing), and add

1 lb. of Chromic Acid.

previously dissolved in water.

Work the cloth after the addition of the Chromic Acid one-half hour, allowing the temperature of the bath to drop. At the end of this period

6 lbs. of Bi-Sulphite of Soda

are added to the bath, and temperature raised to 140 degrees, and the cloth worked for ½ hour at this temperature. Rinse or pass through hydro-extractor and dye in bath containing

10 lbs. Azo Green (paste).
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)
½ lb. 20 % Ammonia.

Entering goods at ordinary temperature, bring to a boil and boil one hour. (See Recipe 64, April, for comments.)

RECIPE NO. 110.

Black on Cotton Yarn.

Chromanil Black on 100 pounds cotton yarn.

Prepare dye bath with

8 lbs. Chromanil Black R F.
(Berlin Aniline Works, 72 Front St., New York.)
20 lbs. Glauber's Salt.

Enter yarn at boil, and turn one hour at that heat. Rinse and turn for one-half hour at boil, in a separate bath, to which has been added

1 lb. Bichromate of Potash.
3 lbs. Blue Vitriol.

Rinse.

Use less color for standing kettles.

Chromanil Black R F, after treatment with chrome and blue vitriol, will stand cross dyeing, and will not bleed into white when washed together.

RECIPE NO. 111.

Dark Green on Cotton Yarn.

Direct Green B on 100 pounds of cotton yarn.

Prepare dye bath with

25 lbs. Common Salt.
2 lbs. Direct Green B.
(Sykes & Street, 85 Water St., New York.)

Enter the yarn near or at the boil and continue the dyeing at a boil for at least one hour, and then work for one-half hour after the steam is turned off, while the bath gradually cools.

Dark Green B has a high coloring power, and penetrates the fibre thoroughly and evenly. It is unchanged by acids.

RECIPE NO. 112.

Black on Cotton.

Diazyl Black M B on 100 pounds of cotton.

Prepare the dye bath with

30 lbs. Salt.
6 lbs. Diazyl Black M B.
(C. Bischoff & Co., 87-89 Park Place, New York.)

Dye at a boil for one hour. After dyeing, rinse in cold water and diazotise by working 10 to 15 minutes in a cold bath containing

2 lbs. of Sodium Nitrite

previously dissolved and

7 lbs. of Muriatic Acid.

Rinse in water or a bath weakly acidified with Muriatic Acid.

Develop by working 10 to 15 minutes in a bath containing

1¾ lbs. of Developer No. 2.

previously dissolved in Caustic Soda 36 degrees Tw., and

¼ lb. of Developer No. 5

which may be dissolved in water.

In this manner a dead black may be produced which stands washing and light well. (See Recipe No. 80.)

New Dyes.

We give in this issue, a number of dyes that are new in our columns, and to the trade, that dyers will be more or less interested in for their especial wants.

In recipe 97 will be found an orange yellow on cotton cloth, obtained from Direct Yellow T, furnished by A. Klipstein & Company, New York. This color is fast to light, on all fabrics also, fast to fulling on wool, when dyed either with sulphuric acid or over a chrome mordant. The color in this recipe is used on cotton.

John J. Keller & Co., furnish two dyes that appear in recipe 98 and 108. Diphenyl Blue R R, found in recipe 98, for the production of a blue on cotton yarn, has no particular properties which would distinguish it from the ordinary direct cotton blues on the market. The Diphenyl Green G, in recipe 108, for the production of a green on cotton yarn, however, is light, wash and acid fast, and is very adaptable for cotton and wool mixed goods, dyeing such fabrics perfectly level shades. It is also applicable on chrome mordanted wool.

Farbenfabriken of Elberfeld Company, New York, show in recipes 99 and 101, two valuable dyes that should prove of interest. In recipe 99 is to be found Benzo Chrome Brown B S, for the production of a brown on cotton yarn. This dye has the same shade and properties as this firm's older Benzo Chrome Brown B, but has further advantages of being very fast to acids, for even when spotted with diluted mineral acids, the shade is scarcely perceptibly altered. Our dyer's comments will be read with interest. In recipe 101 we find a turquoise blue on woolen cloth, from New Patent Blue G A, which differs from the older brands B and 4 B, mostly in that it exhausts almost completely, whereas, with the older brands, some portion of the color is left behind in the dyebath. In addition to this, it is greener and brighter in shade, and possesses greater coloring power. It is especially recommended as a level dyeing color for the production of fancy shades on ladies' dress goods and yarn, and, owing to the comparative fastness to milling, it can be employed in combination with alizarine colors for brightening the same. It can also be used for silk dyeing.

William J. Matheson & Co., New York, present the following dyes; Nitrazol Brown B and Nitrazol Brown G, appearing respectively in recipes 102 and 105. These two dyes may be considered together, which belong to this firm's well known range of coupled colors, which are dyed upon a fibre and then coupled with Nitrazol C, or with diazotized Paranitraniline. The fastness to washing, of these new browns, is claimed to be unexcelled, and their usefulness for shades fast to washing can be highly commended. Nitrazol Brown B dyes shades somewhat deeper and blacker than Brown G.

In recipes 106 and 111 appear two dyes, furnished by Sykes & Street, New York, namely, Vidaline Blue 5 B and Direct Green B. Both are used on cotton yarn—the first for the production of a blue, and the second for

a dark green. Both of these colors have merits to which we refer in our dyer's comments.

A New Sanitary Fast Black for Cotton Hosiery.

The success of any line of black cotton hosiery really depends upon the dyeing process. No matter how perfect the goods may be, if the black is not absolutely fast, with a good appearance and feel, they do not take with the trade. Processes almost without number have been used, and in the endeavor to obtain a fast black many chemicals, such as sulphate of copper, acetate of copper, sugar of lead and other similar materials have been employed with the not uncommon result of injury to the wearer. Sometimes the chrome bath used to develop the black after oxidation produces a poison known as chrome yellow. The new black process, which is the invention of Alexander N. Du Bois, and is now offered for sale through his agents, Messrs. Calmore & Co., patent attorneys, 501 Chestnut St., Philadelphia, is guaranteed by them to be free from poisonous chemicals in its production and at the same time losing none of the characteristics which make up a desirable fast black, and, indeed, surpassing them. Mr. Du Bois warrants also, that it is perfectly fast, that the men in the dyehouse will be in no way affected by production of the process, that the goods will not green, stain, crock, bleed or become dirty gray from wear, nor will it tender the goods. It is claimed to be the handsomest and best fast black in the world, not excepting any, in depth and richness of color and lustre and life of the fibre

The goods are dyed in one dip, just as they come from the knitting machine, requiring no boiling off, topping or bottoming, and the color is level and uniform, showing no streaks or spots. When the lisle thread finish is put on, it is an almost perfect imitataion of the genuine, and the silk finish is very handsome. The different tones of color range from jet black to a blue black.

Cost is always a matter of much interest, and in this case is surprisingly low, being only from $1.50 to $2.50 per hundred pounds of dyed hosiery, which compares favorably with other blacks.

The ordinary equipment in use is applicable to this process, and the chemicals employed are such as can be freely purchased in the open market.

We are informed that a number of leading manufacturers and job dyehouses have purchased the process and are using it with great satisfaction, among them being the Bibb Mfg. Co. of Macon, Ga., Brown Bros. & Aberle Co. of Philadelphia, Continental Dye Works, E. Sutro & Son, and others.

Mr. Du Bois, the patentee, has been working on aniline dyes for cotton hosiery since 1882, letters patent having been granted to him in that year and in '83 for inventions in this line. This has been his speciality ever since and he considers this process his greatest accomplishment. The formula and process is sold outright, and, if desired, Mr. Du Bois will go personally to instruct dyers in the use of this new black or to install a plant for such mills as are not already doing their dyeing.

Terms and further information may be had upon application to Messrs. Calmore & Co., patent attorneys, 501 Chestnut St., Philadelphia.

—A preliminary motion has been heard and a preliminary injunction granted withstraining William J. Matheson & Co., Ltd., from selling the product known as "Napthindone," which is claimed by the Badische Anilin & Soda Fabrik (Wm. Pickhardt & Kuttroff, American agents) to be an infringement of their Indoin Blue patent. It will be remembered the latter concern recently obtained an injunction against Kalle & Co. for an alleged infringement of this patent.

QUESTIONS AND ANSWERS

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

Plush, Rubber Lined Lap Robes.

Editor Textile World:

Can you put us in correspondence with a number of manufacturers of plush, rubber lined lap robes, about 48 by 60 inches. We wish robes of this size either in solid colors or with fancy centres. We use a large number every year.

S. L.

We would suggest that you write to The Chadwick Plush Co., Holyoke, Mass., and the Sanford Mills, L. C. Chase & Co., Agts., 129 Washington St., Boston; and possibly The American Buffalo Robe Co., Buffalo, N. Y. We do not know whether these concerns line the fabrics with the rubber themselves or not, but if they do not there are concerns in the rubber trade who make a specialty of proofing or lining all sorts of goods for the trade. It is possible that these latter could furnish the robes. We give you the addresses of several: Monarch Rubber Co. Campello, Mass.; Plymouth Rubber Co., Stoughton, Mass.; Standard Rubber Co., Brockton, Mass. and La Crosse Rubber Mills Co., La Crosse, Wis.

Knit Goods Bleaching.

Editor Textile World:

What machinery is required for bleaching knit fabric in the roll?

K. G.

A series of bleaching tubs with squeeze rollers and a reel upon which to wind the cloth as it comes out of the tub. The cloth is usually put into a hydro-extractor and whizzed and afterwards either boarded, or, according to the more modern method, dried on a special dryer built for this purpose, which dries the cloth evenly to the size of knitting cylinder, or exactly to any required width.

Book on Silk.

Editor Textile World:

In your May issue, an article on silk appears in the Silk Department, in which the following books are mentioned: Ure's Dictionary of Arts and Manufactures; Gilroy's Art of Weaving; Ruegg's Theory of Silk Weaving; Wolfenberger's Theory of Silk Weaving. Will you kindly let me know where these publications are sold?

Mass. E. A.

All of these books, with the exception of the latter, are out of print, and can be obtained only as one may be able to pick them up at second hand book stores. We would suggest our correspondent visiting such places the next time he comes to Boston. He will find no trouble in obtaining the first book mentioned, which appears in two volumes. The latter book can be obtained by writing to Paul Wenzel, 31 East 12th St., New York.

A Scarlet Dye Wanted.

Editor Textile World:

Can you inform me how to dye 100 pounds of wool a fast scarlet, the same as the enclosed sample.

S.

We have answered by mail, giving full instructions, etc.

90's Spun Silk Yarn

Editor Textile World:

Will you kindly advise me where I can purchase a large amount of No. 90's silk yarn delivered on contract?

We have answered by mail giving address of parties who can furnish 90's single. If you want 90's 2-ply we think it would be a difficult thing to obtain it in large quantities in this country; we do not call to mind any concern that is spinning such fine numbers. We should be glad to learn if there is any.

Angora Goats.

Editor Textile World:

Your paper is quoted in the 1898 Year Book, of the Department of Agriculture, Page 425, as authority for certain statements relating to the raising of angora goats in the State of Maine. Can you refer me to any work on the subject of goat raising in this country?

F. A.

We would suggest that our correspondent communicate with C. P. Bailey, San Jose, Cal., who is the best authority in this country upon the angora goat. Mr.

Bailey will undoubtedly cheerfully answer all inquiries of this nature. We would also recommend your buying the following book: "The Angora Goat," by S. C. C. Schriener; Price $3. There is more or less scattered literature concerning the angora goat, but the raising of this animal in the United States has never been carried on to any great extent; hence the paucity of literature concerning this animal. The book just referred to is the best and latest authority that can be procured on the subject. There are a number of consular reports that have been made to the State Department at Washington, on the angora goat, or mohair industry, that would be valuable reading, could these reports be procured. In the earlier numbers of the Bulletin of the National Association of Wool Manufacturers, published in Boston, there are a number of articles on the angora goat.

Oxidizing Process of Dyeing.

Editor Textile World:

What is your opinion as to the oxidizing process of dyeing, direct dyeing, or diamine and kindred colors? Do you think the latter is superseding the former in the best class of hosiery? In equipping a new plant, which would you prepare for?

B. R.

We have replied by mail.

Designers' Instruments.

Editor Textile World:

Can you give me the address of parties from whom I can obtain pick glasses and dies the latter to cut 1-inch square cloth; and where can I get scales such as are used by designers, that will weigh 1/10 of a grain?

J. T.

We have answered our correspondent by letter, giving him all the information and particulars that he asks for.

Rotary Pinking Machine.

Editor Textile World:

We have for some time been looking for a rotary pinking machine, to be used in connection with machines for finishing the edges of fabrics. The machine should be so arranged that the cloth, one yard wide, can be fed into the machine and scallops of any desired size cut from one edge of the goods. There is quite a demand for a machine of this character.

G. M. W.

We should be pleased to hear from any of our readers that have any knowledge of such a machine, for the purposes set forth.

Machine for Applique Work.

Editor Textile World:

Can you inform us where we can purchase the necessary machinery for producing applique work on muslin curtains, table covers, etc. The designs are cut out of the goods and embroidered around the rough edges of the pattern.

S. G.

The machines used mostly for this purpose are the Cornely machines. These can be obtained of A. J. Ahlstrom, New York. We have written our correspondent where he can obtain second-hand machines, if they will answer his purpose.

Mercerizing Cotton Cloth.

Editor Textile World:

In looking over your June number, we see that parties desire information concerning the mercerization of cotton cloth. We should like the same information, if this includes knit cloth.

W. J.

We have had several inquiries of this character since our June number was published. We have answered all such inquiries by mail, giving the necessary information. We will simply say that nearly all of the principal bleacheries and dye works in this country do more or less mercerizing. Some of them do it in the piece.

Finishing Lace.

Editor Textile World:

Will you kindly send us a list of firms who import lace, and who are in a position to buy a web direct from the frame, in the brown state, and finish it?

E. A. A.

Should this meet the eye of any one who can furnish the information, we should esteem it a favor if he would communicate with us.

The Investment of Capital.

Editor Textile World:

I am a young man with a little capital, with no experience in the manufacturing business, but would like to embark in it, if there is a good chance for making money. Will you please tell me which would be the best business to engage in, whether the manufacture of hosiery and underwear, or silk ribbons? What would it cost to start a factory suitable for a man to earn a living at the outset? I have a fair idea of hosiery, but know nothing about silk ribbons. Is there any other industry better than these, that would not involve the investment of more than three or four thousand dollars?

B. H.

No advice that would be considered of the least value could be given in response

to this inquiry, more than it would be extremely hazardous for one to enter into any business with which he is not practically familiar, after long experience. There are instances of a man's succeeding in a business without having any knowledge, personally, of it, when associated with one who is trustworthy and capable in all the necessary qualifications for making the enterprise a practical success. Persons with excellent executive ability and judgment have succeeded in a combination of this kind, but no one would advise it, as the outcome is altogether too problematical.

Aniline Black on Cotton Hosiery.

Editor Textile World:

Can you give me a good recipe for an aniline black on cotton hosiery?

J. B.

The following is a recipe that has been tried with good results, although we are not in a position to guarantee it. It is used for 100 pounds of cotton goods.

Mix 5% Aniline Oil Pure with 10% Muriatic Acid 22° Be., and allow to crystallize. Dissolve the above in hot water and add the solution to a bath containing 100 to 125 gallons of cold water. Then add 6% Bichromate of Potash or Soda dissolved in water; 9½ oz. of a solution of Perchloride of Iron 40° Be.; 9½ oz. Sulphuric Acid.

Stir well and enter the cotton. Work it quickly until the shade is even. Allow cotton to remain in the cold bath one hour, turning occasionally. Add

2 per cent. Bichromate of Potash

in solution and raise temperature gradually to 175° F. Work cotton quickly for ½ hour at this temperature, lift, rinse in running water, finish in boiling soap bath and rinse in cold water.

New Publications.

Bulletin of the National Association of Wool Manufacturers, for June, 1899. This quarterly magazine, devoted to the interests of the national wool industry, appears at this time with a fine list of interesting articles, especially the first one, on the New England Wool Manufacture, as the first of a series in chapters, by S. N. D. North, originally written for "The New England States," edited by Dr. N. T. Davis, and published by D. H. Hurd & Company, in 1897. As originally prepared, the sketch was much condensed, and many details have now been added, which are essential to a comprehensive treatment of the subject. It is a rich addition to the literature of the textile industry in New England.

Anthracene Chrome Black F and 5 B. This is the title of a color card with recipes, issued by William J. Matheson & Co., New York. These dyes are new black dyestuffs, which in their properties are said to surpass anthracene acid black. These color cards are so handsomely gotten up that it would be to the taste and advantage of dyers, we should think, to write to the publishers for copies.

Benzo Nitrol Black B and T. Farbenfabriken of Elberfeld Company, New York, have issued a color card relating to these dyes of theirs, for coloring cotton in a simple and effective manner.

Pluto Brown N B and G G. Farbenfabriken of Elberfeld Company, New York have issued color cards pertaining to these dyes for cotton yarn, that are said to be extremely fast to acids, and possess other points of merit.

Fulling Fast Colors. This is the title of Bulletin No. 73, issued by Wm. J. Matheson & Co., New York, and refers to their Hemolin X S, Patented, Morin Yellow A, Patented, and Dry Alizarine, giving recipes and colored samples. These products when used alone or in combination with each other, will produce nearly all of the staple shades required in a woolen mill. We would suggest that dyers interested in these colors write to the above house for this bulletin.

Dyeing and Printing Slubbing. This is the title of a color card issued by Wm. J. Matheson & Company, New York, which we would suggest dyers writing for, as a valuable publication, for convenient reference. The groups of dyestuffs used are principally as follows: Anthracene acid colors; direct dyeing acid wool colors; diamine colors; all of which may be dyed in one bath, and which are equally suitable for dyeing in vats and on mechanical apparatus. Dyeing formulae and samples are given.

Appleton's Popular Science Monthly, for July. New York: D. Appleton & Company. Price, $5 per year. In this issue of this well known magazine, appears a number of timely articles like the following: Scientific Method in Its Application to the Bible, by Rev. David Sprague. In this article, the author points out the justice of higher criticism, and shows that while much has been actuated by unworthy motives, the honest truth seeker is entirely justified in his desire to know the actual history of the most wonderful of all books. "The Antiquated Man in North America," is the title of an article by Dr. A. C. Abbott, geologist, who believes that the many attempts to modernize all traces of man on the eastern coast of North America can be safely relegated to the limbo of misdirected energy.

Appleton's Popular Science Monthly for June, 1899. Boston: Ginn & Company. This quarterly is edited by the faculty of Political Science of Columbia University, and contains the following timely articles, which students in political economy could read with much instruction: Problems of an Inter-Oceanic Canal; England and Her Colonies; Imperialism and the Civil Service; Connecticut as a Corporate Colony; Prices in the Confederate States; City and Country Taxes.

Cotton Machinery. Mason Machine Works Taunton, Mass., 1899. Seldom has a catalogue been presented in more attractive form than that of the 1899 edition of the Mason Machine Works. It is a handsomely bound book of 350 pages, profusely illustrated not only with well executed half tone plates of their machinery and apparatus, but brightened with interesting views of different parts of their works and with other illustrations of general interest. Full details are arranged in a systematic and comprehensive manner, so that information is readily at hand concerning any of their line of machinery, which embraces revolving flat cards, railway heads, drawing frames, combers, sliver lap machines, ribbon lap machines, ring spinning frames, mules and a wide range of looms for all kinds of cotton and silk weaving. Besides the machinery data, there are scores of tables, rules, etc., used in connection with their machinery, and the contents of the whole book is made easily available through the very complete system of indexing. The proper arrangement of a catalogue or book of this description is a task of great magnitude, and the whole work may be marred by poor judgment in arrangement, but this is a most systematic compilation and one that will be kept for constant reference in every establishment which receives one. Not the least interesting feature in the book are the introductory pages, containing a brief history of the works and story of its growth.

2500 Witnesses. With the above title, the B. F. Sturtevant Co., Boston, sends out a most attractive booklet containing am imposing list of buildings wherein the Sturtevant system or apparatus has been installed for the purposes of ventilation and heating. Instead of printing testimonial letters complete, they have grouped under the different lines of industries the installations which they have made, leaving to the interested inquirer the option of applying for such further information as he may wish. This list only includes installations of ventilating fans and of heating and ventilating apparatus, and makes no pretence to cover the equally numerous sales of apparatus for drying all classes of material, or of over 100,000 blowers for all manner of applications. The list of textile installations is a formidable array of many of the leading establishments, including cotton, hosiery and knitting mills, silk, woolen, worsted and felt mills, bleacheries and dye houses, waste, wool pulling and scouring establishments. There are many installations in the textile line which are not enumerated here where special apparatus has been installed. From a typographical standpoint, the pamphlet is most attractive and thoroughly in keeping with the business literature published by this company.

Wanted Six Ring Twister Frames

For making double and twisted and fancy wool yarns, either new or second-hand. Give size of rings, number of spindles, whether a double set of rolls or single rolls machine; what kind of knotting attachment, if any; are spindles on each side of machine or only on one side. Give fullest description of machines and lowest cash prices for same. Address, INDIAN SPRING WOOLEN CO., Madison, Maine.

Industrial News.

—San Antonio, Texas, desires and will take stock in a Cotton Factory, Woolen Mill, Leather Products or Cannery. Experienced and responsible parties (and no others) can get full information by writing the Business Men's Club of that city.

—The Land & Industrial Department of the Southern Railway has an excellent opportunity for a manufacturing establishment, consisting of a good site with buildings on it which the owner will put into a stock company and take stock in payment. Other influential parties will subscribe $10,000 in cash toward the stock of a suitable company. This seems to be an excellent opportunity.

—The volume of business of the Saginaw Manufacturing Co. has increased so much of late that they have been compelled to almost double their power plant. We are informed by them that their plant will be shut down from June 23d to July 5th, for the purpose of installing a new engine, during which time no orders can be executed, except from the stock which is in their warehouse at that time. Their factory and main offices are located at Saginaw, Mich.

—Owing to increase of business, Messrs. Richman & Foley have found it necessary to remove from their former location, 153 North Front St., to their new store, 235 North Front St., Philadelphia, where they have much more room and better facilities for conducting their rapidly growing business in chemicals and specialties for textile establishments.

—As the temperature increases, so does the desire to keep cool. To this end a positive circulation and renewal of air is necessary, and may be secured in the simplest manner by an electrically driven fan. A most carefully designed apparatus of this type is that illustrated and described by the B. F. Sturtevant Co. in its Bulletin M. The fan is designed to move air in large volumes, not merely to agitate it.

An Engine Purchased for the Paris Exposition.

The Buffalo Single Vertical Class "A" Automatic Engine recently exhibited at the Madison Square Garden Electrical Exhibition, has been sold through the New York Office of the Buffalo Forge Company, to the Wilson Smokeless Coal Process Company, No. 11 Broadway, New York City, to be used for running a pressure blower in connection with the boiler plant of the Paris Exposition to be held in 1900. The same high grade construction is employed on all the upright engines, as that of the Buffalo Forge Co's horizontal centre-crank automatic engine which received highest award and gold medal for best service in the power house of the Trans-Mississippi & International Exposition held at Omaha during the summer of 1898, now being used at the electric light plant of the Bowery Bay Building and Improvement Company, near Long Island City, L. I., N. Y. Superiority of construction, simplicity of design, excellence of finish and refinement of regulation have placed the Buffalo Forge Co.'s engine in the foremost rank

of high speed engines. For electrical work, and in fact, any refinement service, its record is unexcelled.

A new engine catalogue is now in the press and upon publication will be sent to anyone wishing same, by applying to the manufacturers, Buffalo Forge Company, Buffalo, N. Y.

—The wonderful endurance of a well designed and thoroughly constructed fan blower is very emphatically evidenced by a recent statement of The William Kennedy & Sons, Ltd., Owen Sound, Can., to this effect: "We have two Sturtevant pressure blowers in use, one of which has run over 32 years steady, and often 24 hours per day, and is apparently as good as when installed, although no one has as yet seen the inside of it. The other has been used for foundry purposes, and has been in use for about 30 years or so."

M. A. Furbush & Son Machine Co. Remove.

When a concern has occupied offices for 25 years or more, their removal is a matter of interest to the trade. The M. A. Furbush & Son Machine Co. and their predecessors, M. A. Furbush & Son, have long occupied quarters on the street floor at 224 Market St., and this address has become so familiarly associated in the minds of the woolen trade with the firm, that it will take some time to become familiar with their new address, 428, 430 Bourse Building. The Bourse, however, is such a textile centre for Philadelphia that the concern is simply keeping in touch with the growth of the trade and trend of business and in their new quarters will be most conveniently located. Their shops are at Twelfth and Market Sts., Camden, N. J.

—The firm of Nevins & Co., one of the oldest commission houses in the trade, is winding up its business, owing to the death of the late David Nevins.

Annual Meeting Maine Woolen Manufacturers' Club.

The Maine Woolen Manufacturers' Club held its annual meet and election of officers at Sebec lake last Friday. Seventeen members of the club and eight invited guests were entertained by Hon. Wainwright Cushing at his beautiful cottage. The members of the club present were: Lewis Anderson, Thomas Beatie, J. B. Mayo, J. G. Mayo, Ellis Jones, M. L. Hussey, Nathan Lamb, Micajah Hudson, Angus O. Campbell, F. W. Brallier, E. M Goodell, S. O. Brown, Wainwright Cushing, E. J. Mayo, Jas. Bathgate, Gordon Dobson and Fred Carr. The invited guests were Dr. Wm. Buck, Dr. H. C. Vaughan, Dr. C. C. Hall, Hon. J. B. Peaks, Hon. W. E. Parsons, B. S. Agnew, Newton Fogg and Walter H. Blethen. The party was transported to and from the lake in buckboards furnished by Sanford Bros. The steamer Marion was chartered for the day and a delightful sail was taken around the lake. It was called one of the most enjoyable trips the club has ever had the pleasure of taking. The visiting members were very much pleased with the lake and its surroundings.

At the business meeting the old board of officers was re-elected, Lewis Anderson of Skowhegan, president; E. E. Hussey of Sanford, secretary and treasurer.

Upon leaving the cottage on their return a vote of thanks was extended Mr. Cushing and three hearty cheers given for him and for Sebec lake.

Philadelphia Textile School.

COMMENCEMENT EXERCISES.

The commencement exercises of the Philadelphia Textile School were held on the 8th of last month. Diplomas and prizes were awarded to the following pupils:

DIPLOMAS.

Merton Jencks Wilmarth, Herbert Stanford Landell, William Steele, Wilkinson Crossley, 2d, James Franklin Gable, William Andrews, and Stanley Thomas Willett.

PRIZES.

The Theodore C. Search gold medal, for "highest honor," to William Steele.

The National Association of Wool Manufacturers' gold medal, for general excellence, awarded to James F. Gable; honorable mention to Herbert S. Landell.

The "Textile World" gold medal, for the best results in final examinations and term work in dyeing, awarded to Wilfred Senior; honorable mention to William Lockwood; honorable mention to Howard Kite.

In the second year regular day class, the N. A. W. M. gold medal, for general excellence, awarded to Francis S. Nettleton; honorable mention to Charles S. Althouse; honorable mention to Irving Johnson.

The N. A. W. M. silver medal, for best results in Jacquard fabrics, designed and woven by the student, awarded to Charles S. Althouse; honorable mention to Francis S. Nettleton.

The N. A. W. M. silver medal, for best results in the preliminary and final examinations, awarded to Irving Johnson; honorable mention to Charles S. Althouse.

In the first year regular day class, the N. A. W. M. silver medal, for general excellence, awarded to Howard Fuller; honorable mention to James V. Pomeroy.

The N. A. W. M. silver medal, for the best results in the preliminary and final examinations, awarded to James E. Corcoran; honorable mention to Fred Roy Smith; honorable mention to R. R. Shillingford.

The N. A. W. M. bronze medal, for best results in color harmony and figured design, awarded to Frank W. Simons; honorable mention to James V. Pomeroy.

In the third year regular evening class, the N. A. W. M. silver medal, for general excellence, including best results in final examination, awarded to Philip O. Schmælzle; honorable mention to Otto Porst.

In the second year regular evening class, the N. A. W. M. bronze medal, for accuracy and neatness in work in connection with regularity of attendance, awarded to Robert J. McCuen.

In the third year evening dyeing class, the N. A. W. M. bronze medal, for best work in dyeing coupled with the final examination, awarded to Leroy Briggs; honorable mention to John G. Wardlaw.

Your Vacation.

It is time you decided where to spend it. Would you not like to spend it at far-famed Bar Harbor? You will not have a better opportunity than is afforded this year by the American Institute of Instruction, the oldest educational association in this country, which holds its 69th annual meeting at this noted resort, July 6-10. For this occasion greatly reduced rates are offered by both railroad and steamship companies, with privileges of making the journey partly by rail and partly by water. On the return trip stop-over privileges will be granted at or east of Newport Junction, Me. Return tickets are good until July 31.

An opportunity is here given of seeing the most beautiful and interesting stretch of sea coast in America. Numerous side trips, also at low rates, have been arranged,—by boat to Northeast and Southwest Harbors, Millbridge, Jonesport and Machiasport; by rail to Bangor, Eastport, St. John, Mt. Kineo, and other places of interest.

The hotels have agreed to give special rates, while for those whose means are limited, or who wish the quiet and comfort of private homes, there is ample opportunity at a merely nominal price.

The meetings of the Institute are held morning and evening, leaving the afternoon free for sight-seeing. The list of speakers includes Gov. Powers of Maine, Pres. Eliot of Harvard, Prof. Tyler of Amherst, Hon. Horace G. Wadlin, Chief of the Bureau of Statistics of Labor; Bishop Lawrence of Massachusetts, and many others.

Music at all sessions will be furnished by the famous Temple Quartette of Boston. Any person who wishes may share in this delightful summer outing. How it may be done is told in a 20-page bulletin, giving full particulars, which may be had by sending your address on a postal card to the Secretary, Edwin H. Whitehill, Bridgewater, Mass.

The Morley Button Manufacturing Co., Manufacturers of Ring Travellers.

The manufacture of spinning and twisting ring travelers is generally known to be controlled by a strong combination which has held the field successfully for a number of years. The entrance into this field by such a strong and successful concern as the Morley Button Manufacturing Co. will, therefore, be viewed with much interest by cotton manufacturers. The Morley Co. are widely and favorably known in other branches of the manufacturing industry and their plant, facilities and capital are such that they may be depended upon to meet competition as it may arise. Entering the field with a full knowledge of the conditions that prevail, they believe that they can satisfy every requirement of cotton spinners, and are offering attractive inducements for their trade. They have associated with them in this department of their business men who are familiar with the wants of the spinners, and they invite correspondence and would be pleased to send samples and submit prices. Their Boston address is 205 Congress St.

—Georgia, Athens. The sale of the Athens Knitting Mill to James H. Dootson for $1800 has been confirmed by the court.

The Record Broken.

Daniel I. Murphy, the enterprising wool stock dealer on Delaware Ave., Philadelphia, holds the record for baling rags for the country. In 10 hours, beginning in the morning, his men baled, tramped and got out of the press 94 bales ready for strapping. Mr. Murphy offered his men a little bonus to make the record, saying he would present each man $1 for each bale that would come out of the press that day exceeding sixty. Consequently $34 was divided between the men. Mr. Murphy said that the record would have been 105 bales, at least, had the stock lasted, and he is now wondering if Philadelphia is the slowest town in the world, after all.

Instruction Papers.

The American Correspondence School of Textiles, New Bedford, Mass., has already issued publications approximating one thousand pages of closely printed instruction papers dealing with most of the departments of cotton mill work, designing of cotton, woolen, worsted, silk and other textiles, and general textile information, and the courses of instruction are proving so popular that Director C. P. Brooks intends, with the assistance of his large staff of instructors, to publish another thousand pages before the last of the year.

These instruction papers are supplied to the students of the school for use as text-books without extra charge, and become valuable works of reference, in fact, being the most complete series of text-books ever written on American machinery. A catalogue may be had free by addressing the mailing department of the school.

Berlin Iron Bridge Co.

The following orders have been received by the Berlin Iron Bridge Co., East Berlin, Connecticut: The Council of Rangitikei County, New Zealand, for a highway bridge, consisting of a single span of 204 feet, designed to carry a distributed load of 1500 pounds per lineal foot, or a road engine weighing forty tons. In transmitting this order the Chairman of the Council says: "As far as I know, this is the first order of the kind sent to the United States, and the experiment is being watched by other local Boards." The bridge will be a pin-connected structure on account of the ease and facility with which this class of construction can be erected in the field. A new foundry building, also a one-story building, for the Wheeler & Wilson Manufacturing Company; a new furnace building for the Raritan Copper Company, Perth Amboy, N. J., to be 90 feet wide, 130 feet long, and 22 feet high, constructed entirely of steel, with travelling cranes, run-ways, etc.; factory building for the Port Chester Bolt & Nut Company, Port Chester, N. Y., 32 feet wide, 125 feet long, with supporting trusses and columns of steel, the roof of weave-shed form having a glass exposure on the north, which insures a large amount of light coming from the proper direction; a warehouse building 40 feet wide, 120 feet long, and 20 feet high, to be erected in Dutch Guiana. The Berlin Iron Bridge Company are erecting, at Bridgeport, Conn., for the Armstrong Manufacturing Co., a fire-proof store-

house. The building is 40 feet wide, and 60 feet long. The framework is of steel, and the covering of corrugated iron, lined with the Berlin Company's anti-condensation fire-proof lining.

—The B. F. Sturtevant Co., of Boston, Mass., early recognized the demand for electrically driven fans, which was sure to follow the general distribution of electricity for power purposes. Its first fan motors were built about ten years ago, since which time designs have been perfected, the number of types greatly increased, and a large electrical department established. Some of the recent products of this company in the way of special electric fans are presented in their Bulletins H and M. The former relates to the enclosed fans, the latter to propeller ventilating wheels.

—One of the most unique advertising postal novelties that we have seen for some time is received from the Cranston Worsted Mills, Bristol, R. I., and it is likely to be preserved by its recipients on account of its novelty. It is also a good sample of the printers' art being a perfect representation of a patch pocket on a coat. The pocket is a real pocket, and examination reveals the card of the Cranston Worsted Mills tucked away for reference.

—Owing to the great increase of business in the Southern States, the Dodge Mfg. Co. has opened in Atlanta, Georgia, a branch office, with Mr. W. L. Draper in charge.

Are you Going Anywhere?

This question, as applied to the matter of summer vacation, is almost superfluous. Everybody, of course, is going somewhere this summer, if it is but a few miles away from the city and only for a day or two. Some have decided just where they are going, but the great majority of prospective tourists are undergoing the mental tribulation of endeavoring to select from a multitude of untried places that which is probably the best suited to their taste and their leisure. Nearly all who read this will take their annual summer trip somewhere within the vast vacation region reached by the Boston & Maine railroad system. To those among them who are included in the undecided class above referred to a pertinent suggestion is hereby given: Send 2 cents in stamps to the Passenger Department, Boston & Maine Railroad, Boston, Mass., for the 1899 issue of "Summer Resorts and Tours," and having, from a perusal of this, made a tentative decision as to which of the innumerable resorts therein described to go to, send another 2 cents in stamps for that particular illustrated book of the "Picturesque New England Series" devoted to the section wherein the selected resort lies, and the vacation is half begun.

"Summer Resorts and Tours" is an 80-page book in pocket form containing a complete list of New England mountain, lake and seashore resorts reached by the Boston & Maine and its connections, together with a revised directory of hotels and boarding places; excursion routes and rates, steamer and stage connections, time-table of through trains, parlor and sleeping car rates and arrangements, up-to-date maps, and a variety of other information indispensable to the tourist. You cannot afford to travel without a copy of this outing encyclopedia in your pocket.

Hopkins Machine Works.

Notice is given of the dissolution of the co-partnership previously existing between Addison S. Hopkins and James A. Potter, Mr. Hopkins having purchased Mr. Potter's interest in the firm business of A. Hopkins & Co. The business will be carried on in the future by Mr. Hopkins alone, under the name and style of the Hopkins Machine Works. They will manufacture spindles and the well-known line of fulling mills and other woolen machinery.

Holbrook Souvenirs.

We have received from the Holbrook Mfg. Co., 466 Washington St., New York, manufacturers of all kinds of mill soaps, two attractive souvenirs which they are sending out to their customers and friends, one of which is a handsome envelope opener and the other a pretty penwiper with the national colors. We believe finishers who have not received one of these souvenirs could probably get one by sending stamp and mentioning the Textile World. They are useful desk ornaments.

Clutches.

The way they work on an oyster steamer; it is the severest kind of work.

New Haven, Conn., April 27th, 1897.
The Eastern Machinery Co.:

Gents:—It is with pleasure that I write to inform you that the friction clutches that you made for me and put into the oyster steamer "H. A. Barnes" give entire satisfaction in every way. I have never seen their equal, and doubt there being a clutch made that is as good for use in oyster steamers. I am glad that I did not put in the screw clutch that I first thought of.

FRANK T. LANE.

A large number of the friction winding drums in use in the oyster business, are those made by The Eastern Machinery Co., New Haven, Conn.

—*Connecticut, Danielson. Regarding the Uncas Knitting Mills, we are informed by the officers of the company that the old Aspinock Knitting Mill has been purchased and their plant has been removed to it. Their product is children's fine ribbed hosiery and men's fine half hose. They have 100 new knitting machines. The former name was H. E. Wilson & Co.

—Massachusetts, Everett. The machinery of the Puritan Knitting Mills, formerly located in New York City, has now been transferred to Everett, Mass., and is being operated under the management of Oscar L. Bailey and Charles A. Spalding.

Consolidation in Edging Trade.

FRIEDBERGER MFG. CO. SUCCEEDS FRIEDBERGER & CO. AND GEO. H. BAKER'S EDGING PLANT.

FRIEDBERGER & CO, MANUFACTURERS OF BRAIDS AND LACES, GERMANTOWN.

Philadelphia, July 1st, 1899.

Dear Sirs:

We have this day sold our entire plant to the Friedberger Mfg. Co. All accounts due us are payable to the corporation, who assume all our contracts, orders and liabilities.

Yours respectfully,
FRIEDBERGER & CO.

Woonsocket, R. I., July 1st, 1899.

Dear Sirs:

Owing to the very severe and increasing competition, thereby causing absurd and excessive price cutting, resulting in the selling of a large amount of edgings at less than actual cost, we have decided to discontinue the manufacture and sale of edgings. With this end in view, we have this day sold to Friedberger Mfg. Co., our entire edging plant, including good will of same and all orders now on book with us.

GEORGE H. BAKER,
Formerly represented by Fleming & Chapin.
Woonsocket, R. I.,
June 28th, 1899.

Philadelphia, July 1st, 1899.

Dear Sirs:

In announcing the purchase of the good will and entire edging plants of Friedberger & Co., of Germantown, Philadelphia, and George H. Baker, of Woonsocket, R. I., the latter formerly represented by Fleming & Chapin, together with all orders now on book with these concerns, we desire to make a statement in connection with this purchase.

The edging business has been in a chaotic state for some time past, partly as a result of needless multiplication of styles, causing consequent confusion to buyers.

In order to simplify matters and correct abuses which have crept into the business, which abuses are injurious alike both to the buyer and seller, we have purchased the above-mentioned plants, which will be consolidated at this address, giving us a production large enough to insure deliveries of any orders buyers will intrust to us. The control of these plants puts us in better shape than ever to properly take care of your wants.

We invite the trade of all buyers of edgings who are willing to meet us fairly and do business on the principle of "live and let live," and be fair in their demands upon us.

FRIEDBERGER MFG. CO.,
Simon Friedberger, President.
Succeeding Friedberger & Co.

—Massachusetts, Newburyport. There seems to be good authority for believing that Seth A. Borden and others who recently bought the Peabody Mills and are now running same, will purchase the mills of the Victoria Mills Corporation, which are now idle. The equipment includes 18,000 spindles and 500 looms; steam power.

—Michigan, Pontiac. The Pontiac Knit Goods Mfg. Co. has absorbed the plant of the Wakefield Knitting Co.

New Bedford Textile School.

New Bedford, Mass., is an especially suitable location for a Textile School. With but one exception (Fall River) it is the largest cotton manufacturing city in the country, its spindles numbering 1,282,332, and its looms 23,610. It has long been famous for the fine cotton yarns, fancy woven fabrics, novelties, and generally high grade of goods manufactured within its limits.

High grade combed yarns are produced in New Bedford to a greater extent than in any other city, while the mills are engaged in the manufacture of fine shirtings, muslins, lawns, sateens, lenos, checks, pique, jacquard, and other fancy fabrics to an extent unknown elsewhere. New Bedford's great advantage in this respect can be attributed principally to the fact that her mills are nearly all of recent construction with the most improved and up-to-date equipments. With but two exceptions, her eighteen great textile corporations, operating more than forty mills, have all been organized since 1881. The environment of these mills is in itself a benefit to those students who select the New Bedford Textile School as the institute in which to learn the mill business.

New Bedford is one of the healthiest of the manufacturing cities in the United States. Picturesquely situated on the extreme south shore of Massachusetts, it enjoys the mildest climate in New England and has no malaria, and thus offers great advantages to the student.

It is within short distances from Fall River, Pawtucket, Providence, Taunton, Woonsocket and other large cotton machinery building centers.

As will be seen from our advertising columns, a free catalogue of the New Bedford Textile School will be forwarded on application to the managing director of the school.

—Mississippi, Meridian. J. A .and T. C. Fearn, recently lessees of the Co-operative Cotton Mills Co., have now given up this lease, and the mill will hereafter be operated by the owners, the Co-operative Cotton Mills Co. The plant has 50 knitting machines and makes seamless hosiery.

—New Hampshire, Laconia. Col. J. Frank Crockett has now bought the Hodgson & Holt Mill for $15,000. It is understood that the mill will be leased to Samuel Hodgson, late of the Hodgson & Holt Mfg. Co., who will operate the plant making knitting machinery and other mill equipment.

—New York, Elmira. The Seamless Hosiery Co., of Elmira, and Clark Bros. & Co., Hoosick Falls, have consolidated, taking the name of the Superior Knitting Mills. They also control the Campbell Knitting Mills at Bennington, Vt., which Messrs. Clark & Bruce have recently incorporated. The head office will be located in Elmira. All these mills manufacture ribbed underwear. J. W. S. Clark will have charge of the Elmira mills, R. B. Clark of the Hoosick Falls and G. W. Clark of the Bennington mills. C. E. Bruce will be general manager.

—Wisconsin, Racine. The Racine Knitting Co. has recently been incorporated by James P. Logue and M. L. Osins for the manufacture of silk and woolen mittens.

MILL NEWS.

Cotton.

New Mills.

—Alabama, Huntsville. T. W. Pratt informs us that he, with others, is endeavoring to organize a company to build a cotton mill here, distinct from the new plant of the Merrimack Co. The project has not progressed far enough yet to give particulars.

—Alabama, Eufaula. James Sherry has organized a company here with $50,000 capital to build a 5000 spindle cotton mill on the property which he owns in Hoboken, a suburb of Eufaula.

—*Alabama, Opelika. Subscriptions to the capital stock for a new cotton mill have been started here. $100,000 is the amount to be raised. Payments will be made in weekly instalments. The following committee has been elected to take charge of the matter: Dr. N. P. Banks, J. L. Dean, I. J. Darsey, W. A. Andrews, Col. S. O. Houston and A. E. Barnet.

—Alabama, Ozark. A new cotton mill is proposed for this place, in which J. E. Acker is actively interested.

—*Alabama, Talladega. The new Highland City Mills will not be quite as large as recently reported. They will start with 3586 spindles on hosiery yarns. Work on the new building will be started very soon, and it is expected that production will start October 1st. This company has $50,000 capital. President, J. H. Hicks; treasurer, W. L. Miller.

—Connecticut, East Hampton. The Whitcomb Winding Co. has been organized by H. M. Whitcomb, president; Geo. W. Cressy, treasurer; E. W. Lyons, secretary; Charles H. Cressy, agent and general manager. The company will engage in the winding of thread. Charles H. Cressy was for several years with the Summit Thread Co., and his father, George H. Cressy, has been in the yarn business for many years.

—*Georgia, Albany. D. H. Pope is the party interested in the establishment of a new cotton mill here, under the name of the Dougherty County Mfg. Co. Capital, $10,000. Plans have not yet been perfected.

—Georgia, Americus. Subscription books have been opened by Capt. J. B. Felder, and it is hoped that $100,00 will be subscribed for capital stock of a new cotton mill.

—*Georgia, Columbus. The Columbus Mfg. Co., which is the company organized about a year ago to build a 10,000 spindle mill, will probably go ahead with the project at once. F. B. Gordon is secretary. We understand that most of the capital stock has been subscribed.

—Georgia, Dublin. J. D. Smith is said to have raised $25,000 toward a $50,000 capital company to build a cotton mill here. J. D. Smith, R. C. Henry, T. J. Pritchett and H. H. Smith are stockholders.

—*Georgia, Fort Valley. J. B. James, vice president of the Fort Valley Cotton Mill Co., recently organized here, informs us that they propose to build a $25,000 to $50,000 plant. He also informs us that a committee will visit the manufacturing centres at Massachusetts and North and South Carolina, and that start on new building will probably be made soon after July 1st.

—*Georgia, Greensboro. A meeting of the stockholders of the new cotton mill here has been held and the following officers elected: E. A. Copelan, president; W. R. Jackson, vice president; C. E. Monfort, secretary and treasurer. The plant will be known as the Mary-Leila Cotton Mill. $100,000 capital stock. The project has been started under very favorable conditions, and it is expected that the plant will be in operation by early fall.

—*Georgia, Griffin. The mill of the new Spaulding Cotton Mills will have 5000 spindles. Work on the building will be started about June 15th, and it is expected that production will start Jan. 1, 1900. Sheetings will be made. W. J. Kincaid will probably be president.

—*Georgia, Jefferson. It is understood that J. C. Turner, J. S. Ayer and others have succeeded in organizing a company to have $125,000 capital, of which about $100,000 has already been subscribed. This new cotton mill project was first mentioned last March.

—*Georgia, McDonough. We have heard from C. W. Strobhar regarding the proposed cotton mill in which he is interested. He states that he is organizing a company to build a 5000 spindle mill to make sheetings and yarns. Capital, $100,000. He is meeting with much encouragement and expects to incorporate the company very soon.

—Georgia, Macon. It is very probable that the Travelers' Protective Association, George Collier, president, will establish a cotton mill here on the co-operative plan.

—*Georgia, Poulan. We learn that the mill of John G. McPhaul, which was to be known as the Aberdeen Mills, will now be known as the Poulan Cotton Mills. We thought that carding and spinning machinery had been put in, but Mr. McPhaul informs us that this is not so. He expects to soon secure equipment, however, which will consist of 5,000 spindles and 150 looms. He has a two story brick building, 58x214, a Corless engine and 250 h. p. boilers, all new and free from indebtedness.

has been appointed here, consisting of G. R. Stanton, G. E. Knox, J. B. Robinson, E. P. Newton and others, to raise about $75,000 by subscription for stock of a new cotton mill company here.

—Georgia, Quitman. A new mill is proposed here. The interested parties are William Spaine, F. J. Spaine and Judge M. Morton.

—Georgia, Social Circle. A committee

—Louisiana, Monroe. Judge A. A. Gunby has $40,000 already subscribed toward a new cotton mill here. He hopes to raise $100,000. Nothing will be done toward starting the plant until this has been done.

—Louisiana, Shreveport. The new cotton mill company here known as the Hargrove Cotton Mill Co. has now been incorporated with a capital stock of $250,000. This is a larger capital than was at first intended. The interested parties are H. H. Hargrove, Leon M. Carter, William Winter, John W. Taber and others.

—Maryland, Hagerstown. J. G. Rutledge is getting information regarding the establishment of a factory for making cotton twine, cordage, etc. We understand that the location of the plant has not been decided upon.

—Mississippi, Arcola. The Arcola Mfg. Co. has been chartered with a capital stock of $50,000, with permission to increase to $100,000, to manufacture cotton and woolen goods. The incorporators are A. J. Aldridge, W. O. Aldridge, Charles L. Wortham and A. G. Paxton.

—Mississippi, Canton. The new cotton mill proposed for this place will probably be established with $150,000 capital. The interested parties are Pietro Trollo, Carroll Smith, John Wohner, Isadore Gross and others.

—Mississippi, Jackson. The new Madison Cotton Mill to be built here will cost about $100,000. Interested parties are Thomas Tate, W. T. Nelson, A. M. Smith and others.

—*Mississippi, Lexington. H. W. Watson, whose name was mentioned recently in connection with a proposed new cotton mill at this place, informs us that although the project is likely to materialize, nothing definite has been decided upon yet. It will, however, probably be a cloth mill. Other interested parties are R. E. Wilbum, W. L. Jordon, H. F. Willis and Morris Lewes.

—*Mississippi, West Point. About $90,000 has already been subscribed toward the capital stock of the West Point Cotton Mills. This is to be paid in two per cent. monthly instalments, beginning June 1st. It is expected to raise $100,000. The mill will make domestics and perhaps drills. Probably from 3000 to 4000 spindles will be put in at the start. J. A. McArthur will be president.

—North Carolina, Catawba. It is reported that Long & Lawrence are interested in the establishment of a new cotcon mill here to cost about $100,000; the plant to be situated on the Catawba River, where fine water power and mill site has been offered.

—*North Carolina, Laurinburg. The new mill here to be known as the Scotland Cotton Mill has placed an order for 5000 spindles complete with the Mason Machine Works, Taunton, Mass. The equipment includes steam power, heating, electric lighting and Grinnel sprinklers. The product of the mill will be soft yarns, 22 to 44. A. L. James is one of the officers.

—North Carolina, Statesville. A new cotton mill is proposed here to cost about $75,000. Among the interested parties are President Wm. Wallace and Treasurer T. D. Miller of the present Statesville Cotton Mills.

—Oklahoma Territory, Oklahoma City. A new cotton mill company has been incorporated with the following directors: W. W. Storm, A. H. Classen, Edward Orne, R. W. Higgins and Asa Jones. It is reported that a plant will be built very soon.

—North Carolina, Lincolnton. The Daniel Mfg. Co. has been organized here. Capital stock, $100,000. A mill for making combed cotton yarn will be built. Edgar Love of Gastonia, N. C., and his son, R. C. G. Love, will be secretary and treasurer respectively, and Daniel E. Rhyne, owner of the Laboratory Mill, Lincolnton, will be preseident and A. M. Price superintendent.

—*North Carolina, Milton. J. B. Connolly informs us that the prospects are good for a mill at this place. The interested parties are Col. C. S. Winstead, Roxboro, N. C.; W. B. Lewis, D. M. Hines, R. L. Walker, all of Milton, N. C.

—*North Carolina, Mooresville. E. W. Brawley informs us that subscriptions are now being raised to build a cotton mill here. Nothing will be done until $100,000 has been subscribed. The proposed mill will make yarns and sheetings. At present they are discussing the advisability of taking power from the Catawba River, eight miles away. Should this be decided upon, the mill may not be built until next summer, as other manufacturing plants must be secured before this power can be counted upon.

—North Carolina, Sanford. W. J. Edwards, one of the promoters of a new cotton mill here, states that a new mill will be built at once with 10,000 spindles and probably looms will be put in. Wm. H. Watkins will be president and Thomas L. Chisholm, manager, both of the Columbia Mfg. Co., Ramseur, N. C.

—*North Carolina, Wilmington. The Delgado Cotton Mill Company has now been incorporated; capital, $250,000; president, E. C. Holt; vice-president, R. Bellamy; secretary and treasurer, J. W. Williamson. Board of directors: Colonel K. M. Murchison, E. C. Holt, J. W. Williamson, E. J. Powers, Jas. H. Chadbourn, Jr.: R. R. Bellamy, of Wilmington, Col. J. S. Carr, of Durham. The foundations for the new buildings will be started immediately. The plant is to have 10,000 spindles and about 500 looms.

—North Carolina, Wilmington. J. H. Chadbourn, Jr., is actively interested in organizing a new cotton mill here to have $100,000 capital. The stock of the Delgado Mill was oversubscribed and this is why this new project is started.

—Pennsylvania, Philadelphia. The partnership between Holdsworth, Newton & Co., manufacturers of cotton tapestry, 1822 Cadwalder St., which has existed for 42 years, will dissolve July 1st. Mr. Holdsworth will continue business at the old location and Mr. H. B. Newton will operate a mill on his own acccunt at the corner of Mascher and Oxford Sts. This mill was formerly occupied by Anderson

& Tournier. He is putting new Knowles looms, which will give him 12 looms in all, with beaming and finishing machinery. The product will be cotton tapestry.

—Pennsylvania, Philadelphia. The Jordan Manufacturing Co. has been incorporated with $100,000 capital, to manufacture fine cotton dress goods, silk stripes, shirtings, etc. They will occupy the building at the corner of Trenton Ave. and Sargent Sts., and will put in 100 new Crompton & Knowles looms. The officers of the company are: M. P. Jordan, Danville, Va., president; Irving W. Jordan, treasurer; Robert F. Kineavy, superintendent. Mr. Kineavy has been for the last ten years superintendent and designer for Jacob Miller, Sons & Company, Philadelphia, makers of the "Eagle" shirt. They will be ready to show samples to the trade in about two weeks.

—Pennsylvania, Philadelphia. Thomas Halton's Sons, manufacturers of table and cotton damask, now located at 2627 Mutter St., with 18 looms, are to put up a new building, four stories, 130 by 54, with engine and boiler house, at the Northeast corner of C St. and Allegheny Ave., from plans of architects Hales & Ballinger, Philadelphia.

—*Rhode Island, Pawtucket. The American Textile Company, which was incorporated last March, by Hezekiah Conant, Lyman B. Goff, and George M. Thornton, is to make fine laces, and it is understood that French operatives will be employed. This will be a new industry in this country.

—South Carolina, Anderson. A new cotton mill is proposed for this place, to be known as the Orr Cotton Mills; capital stock $400,000. The incorporators are Richard S. Ligon, B. F. Maudlin, R. S. Hill, N. B. Sullivan, F. G. Brown, C. S. Minor, J. C. Watkins, W. P. Snelgrove, S. M. Orr, C. F. Jones, and James L. Orr, all of Anderson, except Col. Orr.

—*South Carolina, Columbia. The incorporators of the new Olympia Cotton Mills, capital $1,500,000, are Washington A. Clark, W. B. Smith Whaley, Robert W. Shands, George A. Shields, William H. Lyles, William B. Lowrance, all of Columbia, S. C., and William G. Childs of Waverly, S. C., near Columbia. All the capital stock has been subscribed for, and a site is now under consideration. The plant will have 104,000 spindles and 2600 Draper looms, product, print cloths.

—South Carolina, Newberry. A new cotton mill is under consideration here, and the following parties are among those interested: James McIntosh, T. C. Poole and C. J. Purcell. A 10,000 spindle mill is talked of.

—*South Carolina, Belton. The officers of the new Smyth Cotton Mill Co. have been elected as follows: President, E. A. Smyth; secretary and treasurer, L. D. Blake; directors, E. A. Smyth, F. J. Pelzer, R. A. Lewis, J. T. Rice, A. L. Kelley, R. T. Woodard, J. A. Smith. 20 per cent. of their $300,000 capital stock will be paid in about July 1st.

—South Carolina, Union. The Union Cotton Mills have decided to build mill No. 3, which will be located about two miles from their present mills. The equipment will be 50,000 spindles and 1200 looms, which will give them a total of 137,000 spindles and 4080 looms. This will make the largest cotton mill in the South. The product is print cloths and fine sheetings. T. C. Duncan is president and treasurer and J. L. Hicks superintendent.

—South Carolina, Warrenville. The Warren Mfg. Co. now proposes to start with a plant of 32,000 spindles. Most of the machinery has been contracted for. Among the interested parties are George R. Lombard, George R. Stearns and L. C. Hayne.

—Virginia, Berkley. The Fidelity International Co., with office at Broad and Chestnut Sts., Philadelphia, is now building a new mill at this place, product to be cotton carpet yarn, mattresses and felts. Capital is $2,000,000. The officers are James Pollock, president; I. W. Durham, vice president; Charles A. Furbush, treasurer; E. R. Watson, secretary. Mr. Furbush is vice-president of the Southwark Mills Co., Philadelphia.

Enlargements and Improvements.

—Alabama, Tuscaloosa. The J. Snow Hardware Cotton Mill has bought 28 new looms, which will give them a total of 98. They will now be able to spin all of their yarn.

—Arkansas, Little Rock. The Thomas Cotton Mills have arranged to put in 1000 new spindles.

—Connecticut, North Grosvenordale. The Grosvenordale Co. has started foundations for an addition, which will probably be put into production next October. This will provide for 600 new looms, giving them a total of 3600 looms.

—Delaware, Wilmington. Joseph Bancroft & Sons Company, manufacturers of window shade and book-binding cloths, will enlarge their plant.

—Georgia, Harmony Grove. It is probable that the Harmony Grove Cotton Mills will be enlarged. They are at present operating their entire carding, spinning and weaving departments night and day. Their equipment is 4160 spindles and 156 looms on brown sheetings and drills.

—*Georgia, Monroe. The Monroe Cot-
—*Georgia, Poulan. The Aberdeen Mills, J. G. McFall, president, are now expected to put in carding and spinning machinery. Their plant was started last year with looms only.

—Maine, Lewiston. The Avon Mfg. Co. confirm our report that they are to build an addition which will be ready to start up about Aug. 1st. 75 to 100 new looms are to be added, giving them 125 or 150 looms. This company uses water power. Capital is $100,000. President, C. I. Barker; treasurer, F. H. Packard; agent, A. D. Barker.

—*Massachusetts, New Bedford. Contract has been awarded to Bentley & Benson for the addition to the spinning plant of the Dartmouth Mills. Plans were by architect F. P. Sheldon, 75 Westminster St., Providence. This building will be three stories, brick, about 100 by 70, to cost in the neighborhood of $15,000.

—*Massachusetts, North Abington. A. C. Woodward, manufacturer of narrow fabrics, informs us that he will put in 20 new looms.

—Massachusetts, North Adams. The Windsor Print Works will make improvements at their plant, the first of which will be an addition of one story to their dye house, which is now a two-story building, 200 by 75 feet.

—*Massachusetts, Walpole. The Lewis Batting Co. is fitting up a mill for the manufacture of absorbent cotton. They will have a bleachery for bleaching absorbent gauze. This addition to their plant will have a capacity of 10,000 yds. per day of absorbent gauze. F. E. Clapp, formerly of the firm of F. E. Clapp & Co., of Dedham, Mass., will have charge of this department for the Lewis Batting Co. This is a new department for them.

—*Mississippi, Meridian. Louis Cohn, general manager of the Meridian Cotton Mills, informs us that work will be started immediately on their addition to provide for 1872 new spindles and 248 new looms. Capital will be increased to $200,000, and it is expected that the addition will go into production next November. This will give them a total of 8112 spindles and 450 looms, and they will employ 175 more hands. They will also build a dye house, 50 by 80. Their product is fancy cheviots and colored specialties. Mr. Rothenberg is president; C. W. Robinson, treasurer. Orders have not been placed for a large amount of equipment.

—*New Hampshire, West Peterboro. Regarding the removal of the Clarendon Mills from West Boylston to this place, W. T. Butler, agent, informs us that a new weave shed will be added to the No. 2 mill of the Union Mfg. Co., 160 by 75. They intend to build a new bleachery, but nothing has been decided upon as to its size, etc., at this date.

—New Jersey, Mt. Holly. The Standard Hammock Mills, Bidwell & Borton, are to be enlarged by a new brick building, which will double their output. Work will be started on this structure about July 20th, and they will shortly be in the market for machinery and supplies.

—New York, Buffalo. The Buffalo Weaving Co., now operating 40 looms on webs, halters, etc., is to enlarge its plant with a building 104 by 32, two stories. This will about double the capacity of the plant.

—North Carolina, Charlotte. O. A. Robbins Co., manufacturers of sash cord, have let contract for another building, 40 by 80, three stories, and a new boiler room and a machine shop. They now operate 1350 spindles and 60 braiding machines, running night and day. The new building will provide for 2000 more spindles. It is understood that new braiding machines will not be put in immediately.

—North Carolina, Concord. The Odell Mfg. Co. are building a new weaving mill, 226x126, one story, to provide for 500 looms. This will be mill No. 5

—*North Carolina, Forest City. It is reported that the Florence Cotton Mills are to put in 200 new looms in addition to their increase in carding and spinning equipment, which was recently reported.

—*North Carolina, Henrietta. The Henrietta Cotton Mills inform us that they contemplate adding 20,000 spindles soon and that they have space for this machinery in their present building.

—North Carolina, Salisbury. The Kesler Cotton Mills, which have 5000 spindles, are putting in 150 looms, which will enable them to weave their yarn.

—*Pennsylvania, Philadelphia. Spencer & Chatterton, 5817 Walker St., Wissinoming, Phila., informs us that the addition which we mentioned recently is to be provided for 12 new looms. They expect that the new part will be ready to start in August, employing eight hands on damask table cloths. This will give them a total of 16 looms.

—South Carolina, Clinton. The Clinton Cotton Mills, now operating 300 looms, will probably double their loom capacity. Their entire plant is now running night and day. When this enlargement is made, it will be necessary to run the spinning department only night and day.

—*South Carolina, Fort Mill. The Millfort Mill Co., of which W. A. Watson is president and treasurer, informs us that an addition will be built to provide for 175 new looms, which the company is to put in. This will give them a total of 335 looms. Product is cotton cloth.

—*South Carolina, Greenwood. The Grendel Cotton Mill, D. A. P. Jordan president, inform us that when they add 288 Northrop looms, which they intend doing at once, it will be necessary for them to run their carding and spinning departments night and day. This will give them 624 looms total.

—*South Carolina, Greers. We have further particulars from the Victor Mfg. Co., regarding their enlargement, which they expect to have completed by October, 1899. Their present equipment is 12,000 spindles and 300 looms. The addition is to include 13,000 spindles and 350 looms. This company now has $300,000 capital. President and treasurer, Lewis W. Parker; superintendent, A. J. Burgess; selling agents, Woodward, Baldwin & Co., New York.

—*South Carolina, Walhalla. The Walhalla Cotton Mills inform us that their issue of $50,000 in preferred stock will enable them to put in about 1664 new spindles and 50 new looms, with carding machinery. They have floor space in their present building for this equipment. Their product is four yard sheetings. This will give them a total of 5000 spindles and 200 looms. At present only $72,000 of their authorized capital of $150,0000 has been paid in. President and treasurer is J. D. Verner; superintendent, George H. Peckham.

—*Vermont, Burlington. Work will be started at once on a new addition to the Queen City Cotton Mill. The building will be 228 by 322, one story, with a power house, 37 by 70. The contract calls for its completion September 1.

Mills Starting Up.

—*Connecticut, Danielson. The present owners of the Danielson Cotton Company, have now started the mill

under the management of the former superintendent, O. D. Drew. It is expected that the mill will be running by June 15. There is a prospect of the plant being enlarged, and a dyehouse added, and that fancy cottons will be made.

—*Delaware, Wilmington. The Arlington Mills, which are about to start up again, will be operated by a company known as the Delaware Cotton Company; capital, $200,000. Melville Gambrill, who was formerly manager of this plant, and recently has been operating a mill at Havre de Grace, Md., will have charge of the plant. It is expected that a finer grade of goods will be made than formerly, principally shirtings and dress ginghams.

—*Georgia, Macon. The new cotton mill of W. S. Payne has been started up. The product is yarns.

—*Massachusetts, Easthampton. J. H. Lane & Co., who recently purchased the Williston Mills at this place, have now transferred the mill to the West Boylston Mfg. Co., of Oakdale, Mass. It is expected that the plant will be in operation by August 1st. The yarn will be spun at Oakdale and this mill used for weaving. It has 200 looms. The No. 2 mill will be equipped with spindles. The capital of the West Boylston Mfg. Co. has been increased from $300,000 to $400,000.

—*Massachusetts, Newburyport. The Peabody Mills are now running on full time, under the management of the Peabody Manufacturing Company.

—*Massachusetts, South Hadley Falls. The Glasgow Mfg. Co., whose mill will probably oe started very soon, will be under the management of C. W. Dennett of North Adams, who is at present agent of the Johnson Mfg. Co. and the Dunbar Mills of North Adams, which positions he will retain.

—New York, Valatie. The mill of the Wild Mfg. Co., which has been idle for about three years, started June 1st. This is a cotton cloth and yarn mill with 12,000 spindles and 280 looms.

—*Rhode Island, Woonsocket. Frank Knight, who has leased the Ray Cotton Mill here, will start operations on fine cotton goods at once, employing about 150 hands. M. W. Hudson will be superintendent.

Mills Shutting Down.

—*Massachusetts, Millbury. The Millbury Cotton Mills have shut down. They have been running out stock for several months. The mills are a part of the insolvent estate of John Mason & Sons, Providence, who employ about 150 hands.

Woolen.

New Mills.

—Illinois, Chicago. The Western Felting Company is equipping a mill for th manufacture of tailors' felts. Genera Manager Prendergast, formerly of th Armour Felt Co., is manager.

—New York, Brooklyn. The Planet Mills Manufacturing Company has been in corporated; capital stock, $1,000,000. Carpets will be manufactured. The incorporators are: William Buchannon; Chas. R. Buchannon; A. F. Crichton, of Brooklyn; Francis C. Travers; Eugene A. Philbin, of New York City. The Planet Mills, formerly used by Buchannon & Lyall, tobacco manufacturers will be used.

—New York, Canton. Orrin W. Barlow and R. W. Conway, both of Madrid, N. Y., have leased a mill here, and will establish a wool carding and dyeing plant.

—*Ohio, Cleveland. The Saeltzer Woolen Co., whose new plant is being built at 69-73 Leyden St., will turn out fine shoddies and extracts. The plant will have seven sets of cards and four pickers. Otto A. and Charles V. Saeltzer comprise the company. They were formerly located at West Park, O.

—*Pennsylvania, Norristown. The Coral Mfg. Co. is located in the building corner of Oak and Smith Sts., Norristown. They will manufacture art squares, employing about 30 hands. This is a new concern with $10,000 capital. President, Joseph Greer; treasurer, John Greer; superintendent, W. E. Montague; selling agent, John Black, 31 East 17th St., New York City. The plant has ten 125 inch Jacquard looms; steam power.

—*Pennsylvania, Philadelphia. W. & J. Sloane of New York(whom we recently reported were to remove the machinery in their Oldham Mill at Paterson, N. J., to Philadelphia, have bought land, 112x500 feet, corner of Allegheny Ave. and Boudinot St., Philadelphia, where a new mill will be erected before Nov. 1st. They have also bought looms and other machinery from the Chauncey Tapestry Co. of Chauncey, N. Y., which will be combined with the machinery now in the Oldham Mill.

—Pennsylvania, Sunbury. The Sunbur, Worsted Spinning Co. expects to have its new plant running this month. They have made alterations to an old building here, and will employ about 30 hands, having 800 worsted spindles. The product will be worsted yarns for braids, hosiery, golf and the dress goods trade. Steam power. The company has $16,000 capital. President is Johnson B. Miller; treasurer, George H. Gibson; selling agent, Thomas H. Ball.

—*Rhode Island, Woonsocket. Ground has been broken for the foundation of the new mill of the French-Belgium Co. The office of this company is now in the Butler Exchange building, Providence, R. I., Charles Loridans in charge.

—*Tennessee, South Knoxville. The woolen mill now being built here by W. T. Parham, formerly operating a mill at Marysville, Tenn., is now nearing completion, and will be ready for machinery August 1st.

—*Virginia, East Radford. The Newby Woolen Mfg. Co., formerly of Snowville, Va., expects to start its plant here this week, employing 25 hands on skirts, blankets, flannels and coarse yarns. The company has $10,000 capital. President, S. J. Fisher; treasurer, E. F. Gill; superintendent, T. C. Newby. They have one set of cards, 13 looms.

Enlargements and Improvements.

—Connecticut, Norwich. The woolen mill of Hall Bros., which has been shut

down for four weeks making extensive repairs, has now been started. They will build a new brick building, 74 by 30, two stories, to contain a carbonizing plant. A 100 ft. tower, with tank of 50,000 gallons capacity, will also be put up.

—*New Jersey, Passaic. We note a report that the additional buildings recently started for the Botany Worsted Company, are to be equipped for the manufacture of carpets, a new branch of this company's business.

—New York, Oriskany Falls. The Oriskany Falls Knitting Co., underwear manufacturers, who have recently purchased the Langley Yarn Mill, are thoroughly overhauling the machinery and plant and expect to add two complete sets of carding and spinning machinery. This will make a four set yarn mill. Improvements are also being made at the knitting mill.

—*Pennsylvania, Shickshinny. S. Feather & Co., in reference to their enlargement, inform us that they have leased a new building and are now removing their machinery into it. They will also put in new machinery. It is probable that some new capital may be put into the business.

—Rhode Island, Olneyville. The Crown Worsted Company will put up a new building at the corner of Oak and Tory Streets, 204 by 40 feet; brick; two stories.

—*Rhode Island, Woonsocket. The Guerin Spinning Co. started foundations June 26th for an addition to relieve the somewhat crowded condition of their plant and to provide for some new machinery, such as spoolers, winders, etc.

—West Virginia, Clarksburg. The Clarksburg Woolen Mills are putting up a two-story addition, 40 by 80, to be used for the finishing and picking departments. James T. Sanderson is superintendent.

Mills Starting Up.

—Connecticut, Killingly. The Dayville Woolen Co., which has been running on short time for several months, has now started up in full. This plant has 14 sets, and is making golf capes.

—Kentucky, Owensboro. The Owensboro Woolen Mills, which have been shut down for several weeks, were started up recently. This is a two-set plant making jeans.

—*Maryland, Bay View. We have just heard from Daniel Turner, who has purchased the Providence Woolen Mill here. He was formerly located in Philadelphia. He informs us that he will make woolen cloth, flannel and blankets. He has one set of cards, three broad and seven narrow looms; water power.

—Massachusetts, Cherry Valley. Philip Pfaffmann has purchased the two-set satinet mill until within about three months operated by Lucien Butler. It is expected that he will start same very soon.

—Massachusetts, Dalton. The former Glennon Mills have been leased by W. D. Sawyer, recently treasurer of the Sawyer Woolen Mills, Dover, N. H., and W. H. Reddick. It is understood that the product will be sold direct. J. H. Hendry, formerly designer at the Globe Woolen Company, Utica, N. Y., will be assistant superintendent and designer.

—Massachusetts, Uxbridge. Richard Sayles & Co.'s four-set satinet mill was started up last week, after a long idleness.

—New Hampshire, Windham. Samuel E. Smith and Joseph Hollings, of Lawrence, Mass., have leased the Golden Brook Mill and will run same on dress goods. Mr. Hollings has been overseer in the Arlington Mills for many years.

—New York, Schagticoke. The Schagticoke Woolen Mills were sold May 24th to Ingalls, Leonard & Co., who will start them at once. S. W. Ingalls was the manager of the selling department of the Sawyer Woolen Co., Dover, N. H., and E. E. Leonard was for many years secretary of the Schagticoke Woolen Co. The goods will be sold direct, with offices in New York.

—Pennsylvania, Philadelphia. Thomas Barnett has leased the mill of Hamill & Company, Mill and Cumberland Sts., Germantown, and will manufacture dress goods in cotton and worsted. He will probably put in 100 looms very soon.

—Rhode Island, Stillwater. The Stillwater Woolen Mill was sold at auction June 21, to W. A. Mackie and Jas. Lister, Jr., and Wm. Dracup. The price paid was $25,100. It is understood that they will make the same line as at Centredale, i. e., worsted yarns, 20s to 50s. This is a ten-set plant.

—*Tennessee, Mossy Creek. The Mossy Creek Woolen Mills Co. started up its plant May 1st, making jeans, blankets and yarns. C. M. Kayle is secretary and treasurer, and Ralph Mountcastle is president, but is not active. They have eight looms already running.

Mills Shutting Down.

—Massachusetts, Millbury. C. T. Aldrich's satinet mill has been shut down.

—Rhode Island, Tarkiln. Robert Wilcox, who has leased and operated the Oak Valley Woolen Mill at this place, will shut down July 1st, as his lease expires at that time.

Knit.

New Mills.

—Alabama, Wilsonville. R. G. Weldon & Co. are considering the erection of a mill for making underwear, hosiery and cotton rope. They are getting information from machinery builders.

—Georgia, Columbus. Regarding the new knitting plant, the Georgia Mfg. Co. informs us that a separate new building will be put up and production started next October on hose and half hose, employing about 80 hands. They will use electric power and have 80 knitting machines. The company has been running 150 sewing machines, making pants, overalls and shirts. The company has $100,000 capital. The president is C. L. Perkins; treasurer, E. P. Dismukes, Jr.; superintendent, J. W. Boyd.

—Michigan, Detroit. Hay & Todd Mfg. Co., Ypsilanti, Mich., have opened an annex here, where they will operate 40 to 60 machines on full fashioned underwear; steam power. Their plant here is located at the corner of Chaplain and Baudin Sts.

—*Mississippi, Corinth. The incorporators of the Southern Knitting Co., mentioned last week, intend to put up a new building and install 20 knitting machines. The product will be hosiery. E. P. Auger is of Corinth, Miss.; E. B. Tucker of Blanchard, Mich., and W. H. Walters of Reading, Pa.

—*New York, Warsaw. A new knitting company has been organized as the Warsaw Knitting Mills. Capital, $50,000. Directors: Thomas S. Glover, S. Benedict Whitlock, Lester H. Humphrey, William Watson, all of Warsaw; Oliver Wilson of Philadelphia and others. The officers will be: President, L. H. Humphrey; vice president, S. B. Whitlock; secretary, William P. Rumbold; treasurer, William Watson. The plant will be under the management of Oliver Wilson. A building 400 by 100 will be built, also a dye house and boiler and engine house.

—Pennsylvania, Philadelphia. William F. Grover, for fifteen years with James Kitchenman, of the Ruddington Knitting Mills, has formed a company known as William F. Grover & Company, and located on the third floor of the building at the corner of Putnam and Mascher Sts. The firm started doing business April 1, and are manufacturing ladies' and children's hosiery.

—Pennsylvania, Reading. The Hampden Knitting Mill Co. has been incorporated with $20,000 capital, of which $10,000 has been paid in, to manufacture hosiery. The directors are Mayor Adam H. Leader, Charles L. Moll, William Border, Francis Scheib and others. A. H. Leader is president; Charles L .Moll, secretary; William Border, treasurer. A building has been secured and machinery is being put in. The product at the start will be about 100 pairs per day. It is probable that a new building will be built in the fall.

—*South Carolina, Dillon. The Ewing Knitting Mills is the name of the company incorporated here. Capital $6,000. President, J. P. Ewing; secretary and treasurer, J. M. McNaull. The plant will make men's cotton half hose and it is hoped to have same in operation before July 1st. There will be 17 knitting machines, 15 of which will be new.

Enlargements and Improvements.

—Georgia, Columbus. The Georgia Manufacturing Company will add knitting machines. A new building, to accommodate 100 machines will be started at once and the plant will go into production before Nov. 1st.

—Michigan, Muskegon. The Amazon Knitting Co. will build a large addition to its main bulding. Plans and specifications have been prepared by Archt. Henry Ives Cobb. It will be 161x60, five stories. It is expected that the buildingg will be finished and ready to go into operation Sept. 1st. A large brick warehouse and an addition to the boiler house will also be built. The company intends to make men's underwear in addition to its other lines.

— Minnesota, Minneapolis. The Northwestern Knitting Co. has commenced the erection of an addition, four stories high, to be used for a stock room, office and yarn storage. Their present mill will be devoted entirely to manufacturing. This will give them double their present capacity. Contracts have been let. This company has met with much success in its specialty, Munsing plated underwear.

—New Jersey, Dover. The Swiss Knitting Mill, operated by E. G. Kattermann & Co., is building a large addition which will be completed very soon. At present they operate 30 machines on ladies' ribbed underwear.

—*New York, Albany. Fuld & Hatch inform us that production will be started in new building here about September 1st. Product will be men's, women's and children's cotton and worsted ribbed underwear. Steam and electric power will be used. 28 new knitting machines will be put in, giving them a total of 84.

—Pennsylvania, Philadelphia. Miller Bros., manufacturers of cotton seamless hosiery at 214 West Dauphin St., will put in 17 new seamless knitters and 17 ribbers. Their present equipment is 22 seamless machines and 18 ribbers.

—*South Carolina, Union. It is reported that the Excelsior Knitting Mill Co. will put in a yarn spinning plant of 5,000 spindles. Their knitting machinery is also being increased.

—*Tennessee, Sweetwater. The new machinery at the Mascot Knitting Mills consists of 20 new machines, giving them a total of 82. They make men's half hose. J. A. McGill is president and W. N. Patten, treasurer.

Mills Starting Up.

—New York, Amsterdam. Salesbury & Co., who now operate the Erie Knitting Mills, have leased the mill formerly operated by the Amsterdam Knitting Co. They will make some improvements and start up the plant on cotton knit underwear.

—*New York, Cohoes. F. S. Perrine and Claud Gillette, recently mentioned as having leased the small mill of the Himes Underwear Co., will do business as the Northside Knitting Co. The mill will be started Sept. 1st, employing about 100 hands, with 50 knitting machines; electric and water power. The product will be men's balbriggan and fleece-lined underwear and ladies' cotton, silk and merino ribbed goods. Mr. Perrine was five years with Robert MacKinnon of Little Falls, N. Y., and for the past five years has been superintendent for the Himes Underwear Co., Cohoes. Mr. Gillette has been connected with the New York office of J. V. Farwell Co. of Chicago.

—New York, Cohoes. The Pacific Knitting Mill, which has been closed for more than two months, has now been started up again.

—*New York, Sauquoit. The Lewis Knitting Co., a copartnership between Ladd J. Lewis and Ladd J. Lewis, Jr., started production about June 15th on children's and ladies' underwear. As recently reported, they have purchased the building formerly occupied by the Sauquoit Silk Mfg. Co. They will have 21 knitting machines.

Mills Shutting Down.

—Massachusetts, Methuen. The Swain Mfg. Co.'s knitting mill has been shut down on account of lack of orders.

—New York, Schenectady. The Alpha Knitting Mill, which has been very busy until recently, was shut down for an indefinite period on June 17th.

Silk.

New Mills.

—*New Jersey, Hoboken. The Majestic Velvet Mills, mentioned last week, is the name of a new corporation, with $50,000 capital. President and superintendent, Max Meyenberg; secretary, Max Jaegerhuber; selling agents, Abegg & Rusch, New York. A new building has been put up. The production will start about July 1st, employing 60 hands. They will have 30 new looms, running on black and colored velvets.

—*New Jersey, Paterson. The Holzman Silk Mfg. Co. inform us that they expect to start up the Adams Mill on Van Houten St. about Aug. 1st. This is a new concern, Samuel S. Holzman, manager. They will operate 25 looms on plain and fancy ribbons, all widths, using both steam and water power.

—*New Jersey, Summit. We have word from the Summit Silk Mfg. Co. regarding their new building. This will be a separate new structure, in which they expect to start production September 1st, 1899. They will put in 700 to 800 new looms, employing 350 to 400 hands. Product will be broad silks; steam power. O. DeForest is president and superintendent and W. H. DeForest treasurer. Building will be of brick and iron, 56 by 112, one story, also boiler and engine house. Plans by Architect J. W. Ferguson, Paterson, N. J.

—New York, Oneonta. It is thought that the Paragon Silk Co., of Paterson, N. J., will locate here in a mill formerly used as a piano factory. $12,000 has already been raised in the town for the purpose of purchasing this mill from the present owners and leasing it to the silk company.

—New York, Unionville. Toner & Prescott, whose mill here has 35 looms, have now leased the 18 looms in the mill of the Unionville Silk Mfg. Co.

—*North Carolina, Roanoke Junction. We have from F. S. Paterson, treasurer and manager of the Paterson Textile Co., confirmation of our recent report, but in which we gave the name of the new company as the Roanoke Mills Co. Work has been started on their new building, 75 by 300, in which a silk plant will be established. Product will be silk lining goods with silk warp and cotton filling, also all silk goods. The motive power will be electricity from the canal where Mr. Paterson's other mills are located.

—Pennsylvania, Harrisburg. Joseph F. Hartman is said to be contemplating the establishment of a mill for manufacturing laces and silks, which would give employment to about 200 operatives.

—*Pennsylvania, Pittston. A site will be purchased by Mayor Thomas Maloney and presented to the Sterling Co., provided that they will erect a $30,000 building within a year. This company is now located at Paterson, N. J.

Enlargements and Improvements.

—*Connecticut, South Manchester. Work has been started upon the building of additional stories at the Cheney Brothers Silk Mill. New boilers are also being put in.

—New Jersey, Paterson. It is reported that the Paragon Silk Co. will build an extension three stories high to their mill on Straight and Morton Sts.

—*New Jersey, Paterson. Regarding the report last week in reference to Haenichen Bros., silk manufacturers, we are informed by them that they have bought the mill property in which their manufacturing plant has been operated for years. They have in contemplation the enlargement of the present buildings, but no definite plan or time has so far been fixed upon.

—New Jersey, Paterson. Pelgram & Meyer, silk manufacturers, propose to build an addition to their mill on Front St., known as the Smallwood Mill.

—Pennsylvania, Parsons. The Parsons Silk Throwing Co., which was established here less than a year ago, is to enlarge its plant by a new building, 100 by 40, employing about 100 hands.

—Pennsylvania, Williamsport. The Holmes Silk Co., of Paterson, N. J., which now has control of the Lycoming Silk Mill, is building a four story brick addition to the plant.

Mills Starting Up.

—Massachusetts, Milford. The Magid-Hope Silk Mfg. Co. is putting in machinery at the Colburn-Fuller Factory and expects to start production very soon.

—*New Jersey, Plainville. The Watchung Silk Co. will probably start up in about two weeks. About 20 new looms have been purchased.

—*Pennsylvania, Lock Haven. The new silk mill here, known as the Lock Haven Silk Mill, was started up last week, and when running in full, 300 operatives will be employed. August Schuell is superintendent.

Miscellaneous.

New Mills.

—*Kentucky, Covington. The Overman & Schrader Cordage Co., with main office at Cincinnati, O., inform us that they expect to have their new mill at this place, which we mentioned recently, running in about six weeks. They will employ 400 hands; steam power. Charles Schrader is president and treasurer.

—*New York, Nyack. The Peerless Finishing Co. which we reported last month as incorporated at Passaic, N. J., is to locate at this place. The old shoddy mill has been secured. The plant will employ about 40 hands, and will dye and finish silks by a special process. The corpora-

tion was organized with $50,000 capital stock. James Watson and G. Wallace Watson, of Passaic, are interested.

—Ohio, Cleveland. The Saeltzer Mills Company, manufacturers of fine wool and cotton mixed shoddies, have started building a new mill on Layden St. The main building will be 50 by 100, with other buildings adjoining. Otto A. Saeltzer is manager.

—Texas, Laredo. R. Dennis, of 1806 Farragut St., writes us that he is in the market for machinery for a plant to manufacture feed sacks out of ixtle, the fibre of the Mexican Maguey, and would like to correspond with manufacturers of such machinery.

Enlargements and Improvements

—*Maine, Lewiston. The Lewiston Bleachery & Dye Works will build a two-story machine shop, 125 by 50, and will probably add a story to their present buildings. These enlargements, with new machinery, will cost about $50,000.

—*New Jersey, Newfield. The Newfield Smyrna Rug Co., which was reported in April as intending to make some improvements, have decided to put in ten carpet looms and eight power looms. A new 80 H. P. engine will also be added. They expect to lease another mill.

—Pennsylvania, Philadelphia. The Bournot Dyeing Establishment, at 17th Street and Fairmount Ave., will be enlarged in autumn; contract awarded to G. D. Sipps.

—*West Virginia, Wheeling. We note that J. L. Stifel & Sons, calico printers, have now let contracts for their new building, which will be 150 by 20, two stories, brick. We mentioned this enlargement last April.

Fires.

—Massachusetts, Chicopee. One of the store houses of the Dwight Mfg. Co. was damaged by fire June 17. Loss to cotton and building is estimated at $8,000.

—Massachusetts, Lawrence. One of the storehouses at the Tremont & Suffolk Mills was destroyed by fire June 8th. The loss is estimated at about $25,000, which includes damage to about 1000 bales of cotton.

—Massachusetts, Fall River. Globe Yarn Mill No. 3 was damaged June 24th, mostly by water. A fire was started in the spinning room by a bolt of lightning, which struck one of the mules. This started the sprinklers, and there was considerable delay in shutting off the water. The loss is estimated at about $4000.

—Massachusetts, New Bedford. In the afternoon of June 12th, a fire started in the dressing room of the Hathaway Mills. It was confined to this department, but the loss to the company, which was largely due to water, is expected to reach nearly $3000.

—Massachusetts, North Andover. The mill of M. F. Campbell & Co., making silk wipers and towels, was damaged by fire on June 29th to the extent of about $2200.

—Massachusetts, Rutland. Moulton Bros'. satinet mill was burned to the ground June 15th. Loss is about $6,000. This was a two set plant.

—Massachusetts, Worcester. The Southgate Woolen Co.'s mill was damaged by fire June 19th. This is a two set mill.

—New Jersey, Paterson. The silk mill of A .C. Nightingale was completely destroyed by fire May 25. The loss is estimated at $50,000, partly insured.

—Pennsylvania, Eddystone. The Eddystone Print Works, William Simpson & Sons, proprietors, were very severely damaged by fire June 22d; fully insured.

—Pennsylvania, Newville. The plant of the Newville Knitting Co. was entirely destroyed by fire June 23d. Insurance, including the building, machinery and stock, amounted to $22,000, which will probably cover the loss.

—Pennsylvania, Oreland. The hosiery mill of C. & G. Sasman was completely destroyed by fire June 24th. The loss was about $30,000; covered by insurance. It is expected that the plant will be rebuilt at once.

—Quebec, Coaticook. The Coaticook Woolen Mill was destroyed by fire June 9th. The fire started in the picker room. The loss is estimated at about $8000.

—Rhode Island, Providence. At the Allen Print Works on June 16th a fire occurred in the dye house, damaging the plant to the extent of about $5,000.

—West Virginia, Terra Alta. The Terra Alta Woolen Mills, John D. Riggs, proprietor, were completely destroyed June 26th by fire. The loss is estimated at $50,000: insurance about $30,000.

Facts and Gossip.

—*Maine, Old Town. Equipment is being put in by the Ounegan Woolen Co., and it is now thought that the plant will be ready to start up September 1.

—Iowa, Davenport. Meek Bros. have filed articles of incorporation to manufacture and sell woolen goods. Capital stock, $250,000. The incorporators are H. H. Meek, B. F. Meek and K. L. Meek.

—New York, Schenectady. The Brandywine Knitting Mills were sold at auction June 22d to a syndicate, including Charles J. Webb of Philadelphia and F. M. Aufsesser, president of the Commercial Knitting Mills, and others. The price paid was $12,250. The property was purchased in the name of Charles J. Webb, who was one of the largest creditors of the old concern. It is understood that the property will not be put in operation immediately, and it is possible that the machinery will be sold off separately.

—Pennsylvania, Philadelphia. J. W. Carson, proprietor of the Star Dye Works, Ruth and Tusculum Sts., has moved his entire plant to larger quarters, corner Second and Bristol Streets.

—Pennsylvania, Philadelphia. The company formerly known as Brown Bros. & Aberle Co. has now been incorporated as the Brown-Aberle Co., located at the same place, Huntingdon and Palethorp Sts. Capital, $500,000, of which $400,000 is paid in. Gustave Rumpf is president; Thomas E. Brown, treasurer; Henry Brown, superintendent, and Harrington & Warring, selling agents. Their equipment consists of 800 knitting machines, 35 sewing machines, 40 seamers. Product is hosiery in cotton lisle and silk.

—Pennsylvania, Philadelphia. The firm known as Burton & Hulton of the Penn. Dye Works, dissolved partnership June 1st. Mr. Andrew Burton continues in the same location. Mr. Hulton retires to engage with his two brothers in the same business in the mill formerly occupied by J. W. Carson at Ruth and Tusculum Sts., Kensington. The firm will be known as James Hulton & Bros., and will make a specialty of dyeing fancy colors in hosiery.

—Washington, Spokane. It is probable that the Post Falls Woolen Mills, now located at Post Falls, Idaho, will be removed to this place. This is a one set mill with $10,000 capital, at present running on woolen hosiery. An interest seems to be taken in this project by local capital, and if the plant comes here it will probably be enlarged.

—Wisconsin, Portage. The machinery of the Bangor Woolen Mills, Bangor, Wis., E. Stickler, manager, will be removed to Portage. This includes one set of cards and two looms. It has been running on hosiery yarns and woolens; water power. The mill was badly damaged by recent washout.

PERSONAL RECORD.

Cotton.

—George Bills, formerly in charge of the carding in the No. 4 mill of the Lonsdale Co., Lonsdale, R. I., has been promoted to the Ann and Hope Mill, and William Lee, overseer in No. 1 mill of the same company, will direct operations in No. 4 mill.

—William Duxbury, overseer of the weaving department of the Williamstown Mfg. Co., Williamstown, Mass., has resigned.

—William Howard, formerly secondhand in the mule room of the Globe Mills, is now night overseer in the mule room of the Nourse Mills of the Social Mfg. Co., Woonsocket, R. I.

—J. P. Pearce has been elected superintendent of the Warren Mfg. Co., Warrenville, S. C. For the past ten years Mr. Pearce has been the superintendent of the Fulton Bag & Cotton Mills at Atlanta, Ga.

—John H. Anderson, overseer of carding in the Lancaster Mills, Clinton, Mass., has resigned and removed to Covington, Ga., to accept a position with the Porterdale Mills.

—George Bromley has resigned as overseer of the carding room with the Pope Mfg. Co., and accepted a position as secondhand in the carding room with the Bernon Cotton Mills, Georgiaville, R. I.

—D. F. Bean, formerly at Lawrence, has been appointed assistant superintendent at the Utica Steam Cotton Mill, Utica, N. Y.

—John W. Bennett, overseer of weaving at the Pilot Cotton Mill, Raleigh, N. C., has resigned owing to ill health and returned to Knoxville.

—F. Bunnell, late of Huntsville, Ala., has accepted the position of superintendent of night spinning at the Henrietta No. 2 Mill, Henrietta, N. C.

—G. H. Buck, late boss weaver at the Galveston (Texas) Cotton Mills, has accepted a similar position with the Asheville Cotton Mills, Asheville, N. C. His brother, L. W. Buck, is superintendent of the mill.

—T Connors has resigned as overseer of twisting at Greene & Daniels Mill, Pawtucket, R. I.

—Samuel Carter, for a number of years foreman of the steaming department at the Arnold Print Works, North Adams, Mass., has resigned. Jeremiah Shea, secondhand at the works, has been placed in charge of the room.

—C. A. Davis, of Bessemer, N. C., has been appointed overseer of carding and spinning at the Edna Cotton Mill, Reidsville, N. C.

—T. M. Ezzell, formerly assistant overseer with the Granite Mfg. Co., Haw River, N. C., has accepted a position as overseer of weaving at the Huguenot Mills, Greenville, S. C.

—James Frye has returned to his former situation as overseer of carding at the Utica Steam Cotton Mills, Utica, N. Y.

—William Forsyth has severed his connection with the Warren Thread Co., Ashland, Mass., with which corporation he has been employed as superintendent for the past five years, and returned to his home in Scotland.

—Patrick Galagher, overseer of mule spinning at the Richard Borden Mill, Fall River, Mass., has been appointed superintendent of the Peabody Mills, Newburyport, Mass.

—W. F .Henderson, lately of Chester, S. C., has been appointed overseer of spinning by the Fairfield Cotton Mills, Winnsboro, S. C.

—W. J. Henderson, overseer of weaving at the Quinn Mill, Petersburg, Va., has been transferred to a similar position with the Hamilton Woolen Co., Amesbury, Mass.

—T. S. Haskell, overseer of spinning in the Clinton Cotton Mill, Clinton, S. C., has severed his connection with that mill.

—Sidney Hopkins, superintendent of carding at the Nos. 1 and 2 mills of the Skenandoa Cotton Co., Utica, N. Y., has resigned, and Edward Linskey, late with the Dominion Cotton Mills Co., Canada, has succeeded him.

—J. W. Hawks, formerly at the Efird Mill, Albermarle, N. C., has been made superintendent of the new spinning mill at the Gold Crown Hosiery Co., Charlotte, N. C.

—B. S. Jones, assistant spinner at the Chewalla Cotton Mills, Eufaula, Ala., has been promoted to overseer of spinning.

—Jesse Jackson has left the employ of the Spartan Mill No. 1, Spartanburg, S. C., where he was employed as overseer of weaving.

—Martin Kitling has been appointed overseer of weaving at the Quinn Mill, Petersburg, Va., succeeding W. J. Henderson.

—Ernest Koella, lately at Knoxville, Tenn., has accepted charge of the carding at the Altamahaw Cotton Mills, Elon College, N. C.

—Patrick Loftus has been appointed overseer of the spinning department at the Atlantic Cotton Mills, Lawrence, Mass.

—J. C. Linder has returned to the Charlotte Cotton Mills, Charlotte, N. C., as overseer of spinning.

—J. S. Lamb, overseer of weaving in the Henrietta (N. C.) No. 1 Cotton Mill, has resigned.

—C. P. Lowney, formerly with the King Phillip Mills, Fall River, Mass., is now overseer of ring spinning at the Wampanoag Mill, in that city.

—Thomas J. McCrary, treasurer and general manager, at a recent meeting of the directors of the Newberry (S. C.) Cotton Mills, was elected president of the mill to succeed J. N. Martin, deceased.

—Charles T. Mitchell, formerly of Gaffney, S. C., has been appointed night superintendent of No. 2 Henrietta Cotton Mills, Henrietta, N. C.

—H. L. Moody, of Roanoke Rapids, N. C., has accepted the position of superintendent at Indian Head Mills, Cordova, Ala.

—W. R. McGraw, secondhand at night at Tucapau, S. C., has accepted a position with the Spartan Mill, Spartanburg, S. C.

—George W. McArthur has succeeded Clement A. Wakefield as overseer of carding at the Laconia Co., Biddford, Me. Mr. Wakefield is now with the Saco & Pettee Machine Shop as travelling salesman.

—John D. Murphy, overseer of shearing in the Pacific Print Works, Lawrence, Mass., has resigned.

—C. L. Myrick, weaving overseer at the Chewalla Cotton Mill, Eufaula, Ala., has resigned.

—Thomas Nelson, of Lowell, Mass., is now with the Blue Ridge Mfg. Co., Petersburg, Va., as overseer of weaving and designer.

—Benjamin Nichols has been appointed superintendent of the Fall River Manufactory, Fall River, Mass., succeeding Benjamin H .Roberts.

—S. C. Phillips, overseer of the spinning, spooling, warping and dressing rooms for the Saratoga Victory Co., Victory Mills, N. Y., has resigned.

—George Putnam is the new cloth room overseer at Reedy River Factory, S. C.

—W. S. Porter, boss weaver at the Fulton Bag & Cotton Mills, Atlanta, Ga., has resigned to accept a similar position at the No. 2 Henrietta (N. C.) Mill.

—George P. Parker, formerly of Portsmouth, N. H., has accepted the position of designer for the Montreal Cotton Co., Valleyfield, P. Q., where he entered upon his duties about the 1st of May.

—Phillip Pelletier, formerly at the Whitman Mills, New Bedford, is now engaged as secondhand of spinning at No. 3 New York Mills, New York Mills, N. Y.

—Benjamin H. Roberts has resigned as superintendent of the Fall River Manufactory, Fall River, Mass.

—R. T. Robinson, general manager and treasurer of the Powhatan Mfg. Co., Norfolk, Va., has resigned, and A. W. Chapin, superintendent, has succeeded him.

—A. H. Smith is the new superintendent at the Pepperton Cotton Mills, Jackson, Ga., succeeding F. A. Cumnock.

—C. E. Shealey, formerly night superintendent at the Smitherman Cotton Mills, Troy, N. C., is now in charge of the carding and spinning at the Bala Cotton Mills, Concord, N. C.

—W. Stewart, late at the Globe Mill, Woonsocket, R. I., and Ann and Hope Mill, Lonsdale, R. I., is superintendent at the Slater Cotton Mill, Webster, Mass., A. W. Brainard having resigned to engage with Robert Knight.

—George W. Smith, boss weaver at the Pearl Cotton Mills, Durham, N. C., died on June 14th at Anderson, S. C.

—H. A. Smith, of Lowell, Mass., is to be superintendent of the Coleman Mfg. Co., Concord, N. C.

—David R. Symes, overseer of weaving in the Acushnet Mill, New Bedford, Mass., has resigned to accept a similar position with the Peabody Mills, Newburyport, Mass.

—H. C. Thompson, lately with the Ashby Cotton Mills, Marion, S. C., has accepted charge of the spinning and cone winding at the Marie Mills, McColl, S. C.

—J. P. Thompson of Providence, R. I., has been appointed superintendent of the Mammoth Spring (Ark.) Cotton Mills.

—Henry Wardle, overseer of weaving for the past four years at the Clinton Mill, Woonsocket, R. I., has retired from the mill business entirely.

—J. E. Williamson, superintendent for the past two years with the Beaumont Mfg. Co., Spartanburg, S. C., is now manager and superintendent of the Ossipee Cotton Mills, Elon College, N. C.

—William Winddup, who has charge of No. 2 mill of the Spartan Mills, Spartanburg, S. C., has also been appointed superintendent of Mill No. 1, succeeding J. Jackson.

—C. M. Wilson has recently returned to his old position as boss weaver at New York Mills, N. Y.

—Thomas Yates, formerly of the Pierce Mills, is to be principal of the weaving department at the New Bedford Textile School, and James T. Broadbent, formerly of the Lowell Textile School, is to be assistant instructor in the cotton picking, carding and spinning department.

Woolen.

—Henry Hawkins, formerly with the Oregon City Woolen Mills, has accepted a position as designer with the Nasonville Woolen Co., Nasonville, R. I.

—C. W. Eaton, superintendent of the Plymouth Woolen Co., Plymouth, Mass., has resigned.

—Alexander McVicar, for eight years boss wool sorter in the Beoli Mills, Fitchburg, Mass., has resigned and gone to Scotland. Peter Picken, of Lawrence, Mass., succeeds him.

—Thomas Richmond has resigned as overseer of carding with the Stroudsburg (Pa.) Woolen Mill.

—O. H. Purinton of Willimantic, Conn., is now with the Briggs Mfg. Co., Voluntown, Conn., as boss dyer.

—Thomas E. Ainley, formerly instructor of worsted and woolen carding and spinning at the Lowell, Mass., Textile School, has been employed by the Amsterdam Woolen Co., Amsterdam, N. Y., as overseer of carding.

—Frank A. Brown, boss finisher for the Fridgeton Woolen Co., Bridgeton, N. J., has resigned. Mr. Brown had been with the above company for twenty years.

—William Brady, for three years boss carder for John Lunn, Philadelphia, Pa., has recently accepted a similar position with Edward T. Steel & Co., Bristol, Pa.

—W. H. Brothers, for a number of years superintendent for A. Howarth & Son, Rochdale, Mass., has been engaged by the Merchant's Woolen Co. to manage their mill in Dedham, Mass.

—John Crowther, for a number of years designer for Milner & Co., Moosup, Conn., has been appointed superintendent at the Oneko Mill, New Bedford, Mass., recently purchased by Holden, Leonard & Co., Bennington, Vt.

—J. H. Donahoe, who recently sold out his satinet mill at Blackstone, Mass., has been engaged by the Curtis Mfg. Co., Worcester, Mass., as boss carder.

—M. J. Gahagan, boss carder for the Otrobando Woolen Co., Norwich, Conn., has resigned and gone to New Bedford, where he has a position in the Oneko Mill.

—William S. Haigh, formerly with the Globe Woolen Co., Utica, N. Y., is now boss weaver at the mill of the Amsterdam (N. Y.) Woolen Co.

—William C. Hitchcock, for a number of years confidential bookkeeper for Holden, Leonard & Co., Bennington, Vt., has removed to New Bedford, Mass., to become general manager of the Oneko Mill, recently purchased by Holden, Leonard & Co. Thos. J. Jackson, of Schaghticoke, N. Y., has taken Mr. Hitchcock's position at Bennington.

—Hagan C. Hadleigh, for three years with the Sawyer Woolen Mills, Dover, N. H., has resigned to accept a position as secondhand in the spinning department of the Washington Mills, Lawrence, Mass.

—William B. Isaac, overseer of spinning in the Dews Woolen Mill, North Dexter, Me., has resigned to take a similar position with Amos Abbott & Co., Dexter.

—Robert Irvin, of Rockville, is the new designer at Milner & Co.'s mill, Moosup, Conn., taking the place of John Crowthers.

—A. W. Kennedy, boss carder for four years in the Wood River Mills, Wood River Junction, R. I., and later night carder at the Washington Mills, Lawrence, Mass., has accepted a position in Germantown, Pa.

—A. McKendrick, formerly boss finisher with James Irving & Son, Chester, Pa., has resigned and accepted a position with the Conshohocken Woolen Co., West Conshohocken, Pa.

—M. G. Mitchell, boss dyer at the Old Kentucky Woolen Mills, Louisville, Ky., has resigned and secured a position as salesman for a New York dyestuff house.

—George A. Phillips, overseer of dyeing for the Chariton Mfg. Co., of Pawtucket, R. I., has resigned and gone to England.

—James J. Rutlidge has resigned as overseer of weaving with David Greer, Philadelphia, Pa., and accepted a similar position with H. C. Jones & Co., Conshohocken, Pa.

—C. F. Shaw, of Webster, Mass., has gone to Clifton Heights, Pa., where he will assume charge of the weaving department of the Thomas Kent Mfg. Co.

—William T. Supple, formerly boss dyer for the Mascoma Flannel Co., Lebanon, N. H., is now in a similar capacity with the Byfield Woolen Co., Byfield, Mass.

—W. H. Schultz, boss finisher in the Robinson Mill, South Windham, Me., has resigned and his son, Hugo Schultz, from Lisbon Falls, Me., has taken his position.

—Edwin J. Sout, for 11 years overseer of spinning with John Lunn, Philadelphia, Pa., is now with Henry B. Farrell, Philadelphia, Pa., in a similar capacity.

—Stephen H. Thompson, recently boss finisher with the Conshohocken Woolen Co., West Conshohocken, Pa., has returned to his former position as boss finisher with the Bridgeton (N. J.) Woolen Co., where he was formerly engaged for five years.

—William Trusdell, overseer of carding at the Saranac Worsted Mills, Providence, R. I., has resigned.

—F. E. Weeden, superintendent of the Weybosset Mills, Providence, R. I., has resigned.

Knit.

—Charles H. Garton, for several years general manager with the Glenark Knitting Co., Woonsocket, R. I., has severed his connection with that company.

—Charles Redlaur, formerly with the Gotham Knitting Works, has been engaged as boss knitter at the Lindenwald Knitting Mill, Kinderhook, N. Y.

—P. Butler has succeeded the late Thomas Wood as dyer at the Oneita Knitting Mills, Utica, N. Y.

—Frank Fairchild, of Cohoes, is employed as boss knitter at the Highland Knitting Mills, Utica, N. Y.

—D. S. Karr is now boss knitter for West Bros., Syracuse, N. Y.

—R. B. Lewis, formerly superintendent for the Eagle Knitting Co., Brockton, N. Y., has accepted a position with the Clyde Knitting Co., Waterford, N. Y.

—John McMann, for the past ten years boss knitter with the Commercial Knitting Mill Co., Troy, N. Y., has resigned, and William Packard, of Cohoes, has taken his place. It is possible that Mr. McMann may return to the mill after several months' rest.

—William H. Stewart has been appointed superintendent of the Commercial Knitting Mill, Cohoes, N. Y. The overseers will be as follows: carding, Frank Kittle; spinning, William H. Slater; knitting, Burton Woodworth.

Deaths.

—Elmer E. Scatchard, proprietor of the Oneonta Knitting Mills, Oneonta, N. Y., was thrown from a bicycle while descending a hill and killed.

—Richard P. Eberhart, boss carder at the Athens Mfg. Co., Athens, Ga., died suddenly on June 20th while at work in the mill. He was with the Athens Mfg. Co. for 25 years, and was highly esteemed by all who knew him.

—Ferdinand Rodliff, the oldest mill official in Lowell, Mass., died May 31st. He was 93 years of age, but had the appearance of a man many years younger. He was with the Hamilton Mfg. Co., Lowell, Mass., for 72 years, entering the employ of the company when 21 years old as secondhand in dressing department, and in a few months being promoted to overseer. After 25 years' service in various departments he was appointed assistant superintendent. A few years ago he retired from active service, but had been retained on the books and pay roll as superintendent, giving advice and assistance when the company required it.

—Moses W. Webber, superintendent of the Nashua Mfg. Co.'s Mill, Nashua, N. H., died last month, aged 62 years. He was employed for many years in the York and Pepperell Mills, and for ten years was paymaster of the Laconia Mills. He was then in Salem, as well as at the Everett Mills, Lawrence, and then took charge of Bliss, Fabyan & Co.'s mill in Massachusetts.

—Fred A. Garnsey died recently of pneumonia and heart disease. Soon after finishing his education he entered the employ of the Sanford Mills in Maine, and in a short time was in charge of the blanket mill. He later was in Moultonboro and Cordaville, returning to Sanford about a month before his death.

—Charles Edwin Smith died at his home on Ashland St., Worcester, Mass., June 29th. He was born in Shirley, Mass., Aug. 21st, 1832, where his father owned a cotton mill as well as mills in Barre and Auburn. Early in his life, the family removed from Shirley to Barre, and built the village of Smithville. Upon the death of his father, J. Edwin and his brother Charles came into possession of the mills at Shirley, Smithville and the Stoneville Mills, Auburn, which they operated together until the death of the latter, and after that Edwin ran them alone. The Shirley and Stoneville Mills were eventually sold, but the Barre mill was continued in operation and the family still owns the entire village of Smithville.

—Peter Stevenson died at his home in Clinton, Mass., recently, aged 78 years. He was superintendent of dyeing at the Bigelow Carpet Co. for 35 years.

—Frederick Ojene, a retired woolen manufacturer, died at his home on Walnut St., Lewiston, Me., June 9th, at the age of 74. He came to this country from Hanover, Germany, when 21 years of age, and after working for many years in many of the large woolen and cotton manufacturing centers of the country, went to Lewiston, where his business ability and integrity soon brought him to the front. He was for many years in company with the late J. L. H. Cobb and P. M. Thurlow of Lewiston in the ownership and control of the Cumberland Woolen Mill. He retired from active business some years ago. Four children survive him.

—Barrington Lodge, an old citizen of Albany, N. Y., died at his home on the morning of June 6th. Under the firm names of Lodge, Sheldon & Co., Lodge, Gregory & Co. and Lodge, Wilkins & Co., he carried on a large knit goods business, principally wholesale. In 1891 he embarked in the retail underwear business on North Pearl St., sickness compelling him to retire from which last September. His sons William L. and Charles D. Lodge survive him.

—Bradford W. Nichols died in Providence, R. I., Sunday afternoon May 28th from Brights Disease. He was all his life associated with the cotton interest, as a superintendent of mills, owner and manufacturer, and later as a broker. In 1881 he, together with W. W. Montgomery, bought the Stone knitting mill and operated it for a year or two.

—Samuel R. Warfield died at his home in Oakdale, Mass., June 23d. He was engaged for a number of years in Oakdale in the manufacture of cotton yarns, retiring about a year ago owing to ill health.

—John C. Stahl, a retired woolen manufacturer, died at his home in Newark, N. J., last month, aged 70 years.

TEXTILE WORLD'S

DIRECTORY OF THE

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Detailed information is given about each establishment, viz., the name of the company or firm, names of officers, agent, superintendent, what the mill makes, number sets of cards and combs (if woolen), number of spindles, number of looms, whether steam or water power, whether a dye house or not, who the selling agents are, or if the mill sells direct. In many instances it gives the name of the buyer of raw materials and supplies. To the traveling man, this directory is invaluable, as the maps give the location of the towns where there are mills, so that trips may be planned. The railroad connections are given, and distances may be estimated accurately from the maps.

IT ALSO HAS LISTS OF LARGE BUYERS OF TEXTILE FABRICS FROM FIRST HANDS INCLUDING MANUFACTURERS' SELLING AGENTS AND DRY GOODS COMMISSION MERCHANTS IN PRINCIPAL CITIES; THE MANUFACTURING CLOTHIERS, SUIT AND CLOAK MAKERS, JOBBERS, LARGE RETAILERS BUYING FROM FIRST HANDS. ALSO LISTS OF DEALERS IN RAW MATERIALS IN PRINCIPAL CITIES, INCLUDIND RAG DEALERS. BUYERS' INDEX OF TEXTILE MACHINERY AND SUPPLIES.

The Lists of Buyers are of great value to the Mills.

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WE GUARANTEE

That with the use of CLING SURFACE all belts will STOP slipping, that THE POWER WILL BE PERMANENTLY INCREASED, that belts can be run SLACK, that in leather belts the leather will become as SOFT as calfskin and ABSOLUTELY WATERPROOF; and furthermore that the INCREASE in power in a fair-sized plant will earn the cost of the sample can EVERY month, if used as directed. This applies to all belts, leather, rubber, cotton or a rope drive, whether they are new, old or oily.

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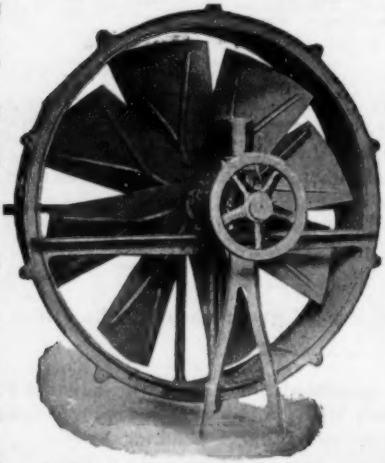

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NEW YORK. CHICAGO.

BUYERS' INDEX.

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Alphabetical Index to Advertisements follows this Classified List.

Air Moistening System.
American Moistening Co., 150 Devonshire St., Boston.

Architects and Mill Engineers.
Berlin Iron Bridge Co The, East Berlin Ct.
Ferguson, John W., Paterson, N. J.
Tower & Wallace, Broadway and 25th St., New York, N. Y.

Automatic Feeds for Cotton and Wool.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Bailing Machine.
Torrance Mfg. Co, 18 Davis St, E. Newark, N. J.

Bandings.
See under Yarns.

Belting.
Albany Belting & Supply Co., Albany, New York.
Alexander Bros., 410 No. 3d St., Phila., Pa.
Link Belt Machinery Co. Chicago, Ill.
Popham, Henry, & Son, Newark, New Jersey.
See also Mill Supplies.

Belt Dressing.
Alexander Bros, 410 No. 3d St, Phila, Pa.
Cling Surface Co., 168 Virginia St., Buffalo, N. Y.

Belt Hooks.
Field, Frank E., New Haven, Conn.

Bindings.
See Tapes and Braids.

Bleaching Materials.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Bobbin Holder and Thread Catcher.
Burr Bobbin Holder and Thread Catcher Co., Hartford, Conn.

Bobbins, Spools, Shuttles, Etc.
Nashua Spool and Bobbin Co., Nashua, N.H.
Parker, Henry Co., Springfield, Vt.
Tebbets, E. L., & Co., Locke's Mill, Me

Boxes, Cloth Boards, Etc.
Pearson, J. T, Kensington, Pa.

Braiding Machinery.
Thun & Janssen, Reading, Pa.

Braids.
See Tapes, Braids and Edgings.

Brass (Perforated.)
See under Perforated Metal.

Brushers.
See Napping Machines.

Burr Pickers.
Curtis & Marble Machine Co., Worcester Mass.
Sargent's, C. G., Sons, Graniteville, Mass.

Card Clothing.
Ashworth, Elijah, Fall River, Mass.
Leigh, Evan A, 35 Mason Building, Boston.

Calico Printers' Machinery and Supplies.
Birch Brothers, Somerville, Mass.
Butterworth, H. W., Sons & Co., Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
See also Dyeing, Bleaching Machinery, etc.

Carders' Tools.
Brown, W. H, Mechanic St, Worcester, Mass.

Carpet Machinery.
Altemus, W. W, & Son, 2816 N. 4th St, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Ms.
Furbush, M. A, & Son, Machine Co, Phila, Pa.
Granger Foundry & Machine Co., Providence, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Chemicals and Apparatus.
Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Chemist.
Adriance, John S., 105 East 39th St., New York.

Combs (Wool and Cotton).
Crabb, William, & Co, Newark, N. J.

Commission Merchants (Dry Goods).
Dusenbury, C Coles, & Son, 396-398 Broadway, New York.
Hayes, O. H., 10 Thomas St., New York.

Copper (Perforated.)
See under Perforated Metal.

Copper Print Rollers.
New Bedford Copper Co, New Bedford Mass.
Phillips Co, The Thomas, Providence, R. I.

Copper Work for Dyers.
Butterworth, H. W. & Sons Co., Philadelphia.
Burkhard, Thomas, 494 Flushing Ave., Brooklyn, N. Y.
Granger Foundry & Machine Co, Providence, R. I.
Phillips Co, The Thomas, Providence, R. I.

Cotton (Egyptian).
Stoddard, Haserick, Richards & Co., Boston.

Cotton Machinery.
Altemus, W. W, & Son, 2816 N. 4th St, Phila. Pa.
Ashworth, Elijah, Fall River, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Stoddard, Haserick, Richards & Co, Boston, Mass.

Whitin Machine Wks, Whitinsville, Mass.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Cotton Openers and Lappers.

Howard & Bullough American Machine Co, Pawtucket, R. I.

Cutters for Knit Fabrics.

Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y

Designer.

William Keiller, 28 Queen St, Belfast, Ire.

Dextrine.

Stein, Hirsh & Co, 165 Duane St., New York.

Dryers.

Birch Brothers, Somerville, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Kenyon, D. R. & Son., Raritan, N. J.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Dusters.

See Wool and Waste Dusters.

Dyers, Bleachers and Finishers.

American Woolen Finishing Works, 164 High St., Boston.
American Yarn Printing Works, 134-150 North 22d St., Philadelphia.
Boston Finishing Works, Williamstown Mass.
Brophy's, T, Sons, Jasper St, Philadelphia.
Cohoes Dye Works, Cohoes, N. Y.
Cranston Worsted Mills (yarns), Bristol R. I.
Firth & Foster Co, Kensington, Pa.
Greenwood, R. & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.
Littlewood, G. J., & Sons, Manayunk, Pa.
Merchants Dyeing Co., Chicago, Ill
New England Thread Co, Pawtucket, R. I.
Novelty Dye Works, Cincinnati, Ohio.
Orianna Bleach Works, 2560 No. 3d St., Philadelphia.
Pawtucket Dyeing & Bleaching Co, Pawtucket, R. I.
Rowland, Samuel, Schuylkill Haven, Pa.
Warren, W, Thread Works, Westfield, Mass.

Dyeing, Drying, Bleaching and Finishing Machinery.

Birch Bros, Somerville, Mass.
Butterworth, H. W, & Sons Co, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Co, 22 and Wood Sts, Philadelphia.
Granger Foundry & Machine Co, Providence, R. I.
Hopkins, Machine Works, Bridgeton, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Kenyon, D. R. & Son, Raritan, N. J.
Lincoln, The, Co, 54 Arch St, Hartford, Ct.
Phenix Iron Foundry, Providence, R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
Phillips, The Thomas Co, 91-95 South Main St, Providence, R. I.
Rusden Machine Co., Warren, R. I.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Woonsocket Machine & Press Co, Woonsocket, R. I.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Dye Sticks.

Bailey, Frank, Cedar Brook, New Jersey.
Haedrich, E. M, 311 1-2 Walnut St, Phila, Pa.

Dyestuffs and Chemicals.

Amend Process Co., 205-211 Third Ave., New York.
American Aniline Co., 138 No. Front St., Philadelphia.
Anchor Color Mfg. Co, 464 Cherry St, New York.
Atteaux, F. E. & Co., 174-176 Purchase St., Boston.
Berlin Aniline Works, 72 Front St., N. Y.
Bischoff, & Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Corey, S. J, 273 Congress St, Boston.
Dillon & Co, 20 Cedar St, New York.
Farbenfabriken of Elberfeld Co, 40 Stone St, N. Y.
Geisenheimer & Co, 189 Front St, New York.
Innis & Co, 3 Cedar St, New York.
Jaeck Bros., The, Co., 62-68 No. 11th St, Brooklyn, N. Y.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y
Johnson, Wm. G, & Co, Uncasville, Conn.
Keller, John J, & Co, 104-106 Murray St, N. Y.
Klipstein, A, & Co, 122 Pearl St, N. Y.
Koechl, Victor, & Co, 122 Hudson St, N. Y.
Matheson, W. J, & Co, 182-184 Front St, N. Y.
Merrimac Chemical Co, Boston, Mass.
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Palmetto Co., The, 942 44 Drexel Building, Philadelphia.
Pickhardt & Kuttroff, New York.
Richmond & Foley, 235 N. Front St., Philadelphia.
Roessler & Hasslacher Chemical Co, 100 William St., New York.
Sharpless Dye Wood Ext. Co, 22 N. Front St, Phila, Pa.
Stamford Mfg. Co, 133-137 Front St., N. Y.
Stone & Ware Co, The, 157 Maiden Lane, N. Y.
Sykes & Street, 85 Water St, N. Y.
Thomas, N. Spencer, Elmira, New York.

Edgings.

See Tapes, Braids and Edgings.

Electrotyping and Printing.

Whitcomb, H. C, & Co, Boston.

Elevators.

Cohoes Foundry & Machine Co, Cohoes, N. Y.
Eastern Machinery Co, The, New Haven, Conn.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Engineers, Mechanical.

Ferguson, John W, Paterson, N. J.

Express Money Orders and Travelers' Cheques

American Express Co, offices in every city

Fans—Exhaust and Ventilating.

See Ventilating Apparatus.

Feed Water Heaters.

Kelley, Benj. F. & Son, 91 Liberty St., New York.

Feed Water Pumps.

Goulds Mfg. Co, Seneca Falls, N. Y.
Phœnix Iron Foundry, Providence, R. I

Finishing Machinery.

See Dyeing, Drying, Bleaching and Finishing

Fluted Rolls.

Cohoes Foundry & Machine Co, Cohoes, N. Y
Thurston, A. G, & Son, Box 528, Fall River Mass.

Fulling Mills for Woolen Goods.

Hopkins, Machine Works, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass

Gas Engines.

Jones, Lewis, 60½ and Media Sts, Phila, Pa.

Gas Singeing Machines.

Birch Brothers, Somerville, Mass.
Butterworth, H. W. Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Ms.
Granger Foundry & Machine Co., Providence, R. I.

Gear Cutting Machine.
Blaisdell, P, & Co, Worcester, Mass
Whiton, The D. E, Co, New London, Conn.

Grates (Boiler).
Earl & Wilson Co, Gastonia, N. C.

Harness Varnish.
D. L. Witmer & Bro, 5th St. and Germantown Ave, Philadelphia.

Heating.
See Ventilating.

Heddles.
Watson, L. S, Mfg. Co, Leicester, Mass.

Hosiery Boards.
Pearson, J. T, Kensington, Pa.

Hydro Extractors.
American Tool & Machine Co , Boston.

Ink, Stamping.
Witmer, D. L, & Bro, 5th St. and Germantown Ave, Philadelphia.

Insurance (Employers' Liability).
Employers' Liability Assurance Co, 2b Central St, Boston, Mass.

Knit Goods Edgings, Trimmings, etc.
Cathcart, John & Co., 115 Franklin St., New York.
Cheney Bros, Silk Goods, 479 Broome St, N. Y.
Friedberger & Co, Edgings, Germantown Phila, Pa.
Hepner & Horwitz, Lacings, 30 Howard St, N. Y.
Krout & Fite Mfg. Co, Allegheny Ave. and Emerald St., Phila.
Weimar Bros, 1817 East York St, Phila. Pa.

Knit Goods Finishing Machines, Crochet, Etc.
Excelsior Sewing Machine Co, 120 N. 7th St, Phila, Pa.
Merrow Machine Co, The, Hartford, Conn.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 2079 E. Cumberland St, Phila Pa.

Knitting Machine Cylinders.
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Machinery.
Beattie Machine Works, Cohoes, N. Y.
Branson Machine Co., 506 John St., Philadelphia.
Campbell & Clute, Cohoes, N. Y.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Excelsior Knitting Machine Manufacturing Co., Allentown, Pa.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos. (Cutters, etc.), Cohoes, N. Y.
Leighton Machine Co, Manchester, N. H .
Mayo Knitting Machine & Needle Co, Franklin, N. H.
McMichael & Wildman Mfg. Co, Norristown, Pa.
Mueller, A, 760 Lexington Ave, Brooklyn, N. Y.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 127 Bread St, Phila, Pa.
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 2079 E. Cumberland St., Phila., Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Needles and Supplies.
Breedon, Wm, & Son, Amsterdam, N. Y.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Crane Mfg. Co , Lakeport, N. H.
Dodge Needle Co., Manchester, N. H.
Ives, Loyal T, New Brunswick. N. J.
Lydall, H, & Foulds, Manchester, Conn.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.
Bullock & Crenshaw, 528 Arch St Phila, Pa.

Lamps, Electric.
Edison, Thomas A., Jr., 27 William St., New York.

Looms.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts. Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St , Phila Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A., 35 Mason Bldg., Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Ms,
Woonsocket Machine & Press Co, Woonsocket, R. I.

Lubricators
Ameledema Oilless Bearing Co., Berkeley St , Wayne Junction, Philadelphia.
Dixon, Jos., Crucible Co, Jersey City, N. J.
Graphite Lubricating Co., Bound Brook, N. J.

Lumber.
Stearns, A. T, Lumber Co, Neponset, Mass.

Lumpers.
Gerry, George, & Son, Athol, Mass.

Machinery Dealers.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.

Machinists' Tools.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E. Co, New London, Conn.

Mails.
Walder, J, Paterson, N. J.

Measuring and Folding Machines.
Curtis & Marble Machine Co, Worcester, Ms.
Elliott & Hall, 54½ Hermon St, Worcester Mass.

Mercerizing Machinery.
Butterworth, H. W. & Sons, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.

Mills For Sale.
Denny, R. B., 143 Federal St., Boston.

Mill Builders and Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct
Ferguson, John W, Paterson, N. J.

Mill Supplies.
American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Bristol, The, Co., Waterbury, Conn
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Easton-Burnham Co., Pawtucket, R. I.
Frost, Geo. T., Paterson, N. J.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Mitchell-Bissell Co., 170 Summer St., Boston.
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg.Co, Leicester, Mass.

Napping Machines.
American Napping Machine Co, Williamstown, Mass.
Ardrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Noils (Silk.)
See Novelty Yarns, Tinsels, Silk Noils, etc.

Pantagraphs for Mill Engraving.
Johnson, C. A, & Co, 22 Dey St, New York.

Patterns of European Novelties.
European Pattern Supply Co., 530 Broadway, N. Y.
European Textile Sample Co., 56 Worth St., New York.

Patent Solicitors.
Crosby & Gregory, 34 School St, Boston, Mass.
Wright, Brown & Quinby, 83 State St, Boston, Mass.

Perforated Metal.
Beckley, A. J. & Co., Garwood, N. J.
Harrington & King Perforating Co., 230 North Union St, Chicago, Ill.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co., 100 William St, New York.

Picker Sticks.
La Bar, L. T., Beateyestown, N J.
Loom Picker Co., Biddeford, Me.

Picking, Carbonizing and Garnetting.
Garfield Woolen Co, Garfield, N. J.

Pipe Covering (Magnesia).
Keasby, R. A, 83 Warren St, New York.

Pneumatic Conveying.
See Ventilating.

Porcelain Guides.
Mitchell-Bissell Co., 170 Summer St., Boston.

Power Transmitting Machinery.
Ameledema Oilless Bearing Co, 149 West Berkley St, Wayne Junction, Pa.
Channon, H, Co, 25 Market St, Chicago, Ill.
Christiana Machine Co., Christiana, Pa.
Eastern Machinery Co, New Haven, Conn.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jones, W. A, 53-59 South Jefferson Street, Chicago, Ill.
Kilburn, Lincoln & Co Fall River, Mass.
Link Belt Machinery Co, Chicago, Ill.
Saginaw Manufacturing Co., Saginaw, Mich.
Wall, William F. Rope Company, 56 South St., New York.

Presses.
Boomer & Boschet Press Co., 338 West Water St., Syracuse, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia
Crawford, J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Hart, Charles, Frankford, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Phillips Co, The Thomas, Providence, R. I.
Sullivan Machinery Co., Claremont, N H.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Pressing Irons, Gas and Air Heated.
Edwards Sad Iron Co, 1420 Chestnut St., Philadelphia.

Printers and Embossers.
Novelty Textile Printing Co, 447-449 W. 14th St, New York.

Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.

Quills.
Parker, Henry, Co., Springfield, Vt.

Reed and Harness Manufacturers.
American Supply Co, Providence, R. I.
Walder, J, Paterson, N. J.

Ribbons.
Cheney Bros, S. Manchester, Ct.

Roofing, Gravel, Slag and Composition.
Armitage Mfg. Co, Richmond, Va.
Eastern Granite Roofing Co., Jersey City N. J.

Roofing, Paint and Paper.
Armitage Mfg. Co, Richmond, Va.

Roving Cans and Sheet Metal Work for Mills.
N. E. Ventilating & Heating Co, 930 Manton Ave. Providence, R I.
Sullivan Machinery Co, Claremont, N. H.
Walrus Fibre Mfg. Co., Medford, Mass.

Schools.
Lawrence Scientific School, Cambridge, Mass.
Lowell Textile School, Lowell, Mass.
New Bedford Textile School, New Bedford, Mass.
Philadelphia Textile School, Phila, Pa.

Screens (Perforated.)
See under Perforated Metal.

Sewing Machines and Supplies.
Birch Bros., Somerville, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Frame, Gibbons, 2nd and Diamond Sts, Phila, Pa.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Nye & Tredick, 606 Arch St, Phila, Pa.
Standard Sewing Machine Co, Cleveland, Ohio.
Scott & Williams, 6th and Arch Sts, Phila, Pa.
Union Button Sewing Machine Co., 164 High St., Boston, Mass.

Shearing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Shell Rolls.
Cohoes Foundry & Mach. Co, Cohoes, N. Y.
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Shoddies.
See Wool Shoddies.

Shuttles.
See Bobbins, Spools, Shuttles, Etc.

Shuttle Eyes.
Mitchell-Bissell Co., 170 Summer Street, Boston

Silk Machinery.
Butterworth, H. W. Sons Co, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Mason Machine Works, Taunton, Mass.

Singe Plates.
Butterworth, H. W. Sons Co., Philadelphia.
New Bedford Copper Co, New Bedford, Mass

Sizing, Starch and Gums.
Quaker City Chemical Co., Wayne Junction, Philadelphia
Stein, Hirsch & Co, 165 Duane St, New York.

Slashers.
Cohoes Foundry & Machine Co, Cohoes N. Y.
Lowell Machine Shop, Lowell, Mass.
Phillips C The Thomas, Providence, R. I.

Soaps.
Holbrook Manufacturing Co., New York
India Alkali Works, Boston, Mass.

Spindles.
Bamford & Smith, Pascoag, R. I.
Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Ward & Vandegrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

Spindle Tubes.
Bamford & Smith, Pascoag, R. I.

Spinning Cylinders.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Spinning Frames.
See Cotton Machinery.

Spinning Frames for Wool
Woonsocket Machine and Press Co., Woonsocket, R. I.

Spinning Rings.
Draper Company, Hopedale, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.

Spinning Tubes.
Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Spools. *See Bobbins, Spools Shuttles, Etc.*

Steam Boilers.
Brown, C. H, & Co, Fitchburg, Mass.
Lee-Odlum Co., Memphis, Tenn.

Steam Boiler Compound.
Straus & Co., 55 Broad St., New York.

Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.

Steam Engines.
Brown, C. H, & Co, Fitchburg, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Hooven (The), Owens & Rentschler Co, Hamilton, O.
Sturtevant, B. F. & Co., Boston.

Steam Specialties.
Butterworth, H. W. Sons Co., Philadelphia.

Tanks, Tubs and Vats.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Challenge Wind Mill & Feed Mill Co, 195 High St, Boston, Mass.
Corcoran, A. J, 11 John St, New York.
Cypress Lumber Co, Apalachicola, Fla.
Stearns, A. T, Lumber Co, Neponset, Mass.
Woolford, George, 2240 No. 9th St, Phila, Pa

Tapes, Braids and Edgings.
Cathcart, John, & Co, 115 Franklin St, N. Y
Fleming & Chapin, 229 Church St., Phila.
Friedberger & Co, Germantown, Pa.
Hamilton, J. H , & Co, 275 Church St, N. Y.
Krout & Fite Mfg. Co., Allegheny Ave. and Emerald st., Philadelphia.
Weimar Bros, 1817 East York St, Phila, Pa.
Young, Wm. M, 3638-40 Frankford Ave, Philadelphia, Pa.

Telephones.
F O. Flummer, 620 Atlantic Ave., Boston.

Tentering Machines.
See Dyeing, Bleaching Machinery, Etc.

Tension Pulleys.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Testing Machines.
Howard, Geo. C., 1783 Barker St., Phila., Pa

Towers.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Challenge Wind Mill & Feed Mill Co, Boston, Mass.

Traveler's Cheques.
American Express Company.

Turbines.
(See Water Wheels.)

Ventilating Apparatus.
Allington & Curtis Mfg. Co , Saginaw, Mich., and East Cambridge, Mass.
Berger Bros. Co., 231-237 Arch St., Philadelphia.
Berry, A. Hun, 23 W. 1st St, Boston, Mass.
Buffalo Forge Co., Buffalo, N. Y.
New England Ventilating & Heating Co, Providence, R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philapelphia.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Washers (Cloth).
Birch Brothers, Somerville, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Hopkins, Machine Works, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Phillips Co, The Thomas, Providence, R. I.

Watchman's Clock.
Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Nanz & Co, 116A Chambers St, New York.

Water Wheels.
Bradway, C. P., W. Stafford, Ct.
Christiana Machine Co., Christiana, Pa.
Humphrey Machine Co., Keene, N. H.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, O.

Water Wheel Governors.
Bradway, C. P, West Stafford, Ct.
Cohoes Foundry & Machine Co, Cohoes N. Y.
Leffel, James & Co, Springfield, Ohio.
Lombard Water Wheel Governor Co, 61 Hampshire St, Boston.

Winders. (Hosiery.)
Universal Winding Co, 226 Devonshire St, Boston.

Wood Pulleys.
Saginaw Manufacturing Co, Saginaw, Mich.

Wool.
Pratt, Daniel S., 180 Summer St, Boston

Wool Cleaning Compound.
India Alkali Works, Boston.

Wool Combing Machinery.
Leigh, Evan A. 35 Mason Bldg., Boston.

Wool Extracts.
Garfield Woolen Co, Garfield, N. J.

Wool and Waste Dusters.
Gerry, Geo, & Son, Athol, Mass.
Sargents', C. G., Sons, Graniteville, Mass.
Stillman-Randall Machine Co, Westerly, R. I.

Woolen and Worsted Machinery.
Altemus, W. W, & Co, 2816 N. 4th St, Phila Pa.
American Tool and Machine Co., Boston.
Atlas Manufacturing Co , Newark, N. J.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. Sons Co., Philadelphia.
Cobb, Thad. S., Machinery Co., Lowell, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
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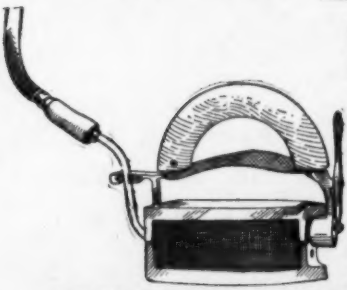

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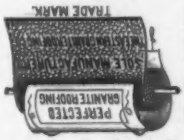

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1349 **Woolen Supt. or designer.** Has been 12 years superintendent of 20 set mill in Conn., until recently, when he resigned on account of children's schooling. Has also been designer and pattern weaver. High character and first-class ability. Age 39; American, married. Experience on worsteds, cassimeres, cheviots, ladies' fancy dress goods, etc.

1227 **A Superintendent** with a thorough practical training in all the departments of a woolen mill making worsted cassimeres, dress goods, cloakings, overcoatings, robes, blankets, shawls, etc. Has a thorough knowledge of designing and has held position in first class mill, to which he can refer.

1268 **Woolen** superintendent or designer. First-class experience in England and America. A first-class man in every way; age 34; married. Fancy worsteds, cheviots, novelty goods, cassimeres, overcoatings, cloakings, dress goods, piece dyes, worsteds and cheviots.

218 **Woolen Superintendent, Designer or Boss Weaver.** Age 35; American. Has worked on all classes of dress goods and men's wear. Can furnish good references and will accept a moderate salary.

1386 **Woolen Superintendent or Boss Carder.** Age 43; American. Familiar with the manufacture of all kinds of woolen goods, is well recommended, and can go immediately.

1490 **Superintendent** Age 37; German. Has worked on plain and fancy worsteds, cotton worsted, all woolen mixes and mixed cassimeres. 14 years' experience in this country.

COTTON SUPERINTENDENTS.

189 **Cotton Superintendent** wants position in Northern mill. Has been in charge of Southern mills for 7 years. Previous experience in N. E. Is well known among mill men, and can furnish the best of references. Age 35; married.

1539 **Superintendent or Agent.** Age 43; married. Has worked on all classes of linen and cotton goods, plain and fancy. At present manager of a large mill, but can leave at one months notice.

1532 **Superintendent.** Has been in mill business all his life, and been with the present firm for a number of years, having been promoted several times. He wishes to better himself.

1306 Young American wants position as cotton superintendent. Experience mostly on cotton warps. Has been bookkeeper, overseer of carding and spinning; also superintendent in Massachusetts mills.

1432 **Desires Position as Superintendent** of cotton mill, or would take overseer of carding in large mill, where good wages can be secured. Age 30; married.

1464 **Superintendent of Fancy Cotton Weaving.** Age 43; married; an American. Will not work outside Northern and Eastern states. Has worked on fancy goods of all kinds, white and colored cottons, worsteds and silks. Is familiar with all makes of looms and dobby heads. Is at present employed, but wishes to better himself, if possible. Refers to present and past employers.

1453 **Superintendent** desires position in a cotton mill. Age 26; married; American. Has worked on prints, fine sateens, sheeting ginghams, duck, denims, cottonades, ticks, awnings and domets. Is familiar with all makes of spinning, spooling and warping machinery. At present employed, but wishes to obtain a more advanced position. Refers to present and past employers.

1269 **Cotton** superintendent, carder, spinner and dresser; 43; married. Has held position in some of the best mills; is strictly temperate, and well recommended. Cotton, flannels, ginghams, crochet and Marseilles quilts, etc.

1496 **Superintendent or Boss Weaver.** Age 45; single. Large experience on all classes of cotton goods and all makes of American machinery. At present employed, but wishes to obtain a better position. Now in charge of 1800 looms. Is willing to go South.

WOOLEN CARDERS.

1501 **Boss Carder on Woolen or** Knit Goods. Age 29; American. Has worked on percentages and all wool goods. Was 11 years with one firm as second-hand and boss carder.

1529 **Boss Carder or Spinner,** on woolen or knit goods. Scotch; age 48; married. Has worked on flannels, cassimeres and hosiery. Good references.

1358 **Wool Carder,** now employed as second hand in large mill. Highly spoken of by past employers, habits, character and ability A1. Capable of taking charge of a room. Experience on high and low grade stock. Age 27, American, married.

1553 **Woolen Carder and Spinner.** Well recommended by past employers. Most experience on carding, wool, worsted, shoddy. Has also had charge of spinning in addition to the carding. Age 35.

1562 **Overseer, Carding and Spinning** of all grades of woolen yarn. Many years' experience in both departments, and is well spoken of by past employers. Age 38; married. Good machinist. Has set up machinery.

1367 **Boss Carder** of wool, shoddy, or cotton. More than 12 years experience as boss carder in leading knitting mills in N. Y. At present employed but desires to change for $3 00 a day or better. Can take charge of mule spinning also. Married; age 36; American.

1564 **Boss Woolen Carder,** experience on all kinds American cards and Platt cards. Refers to several good mills where he has worked from 3 to 6 years. Very steady and hard worker. Age 42, not married.

1565 **Wool Carder,** has worked 9 years as second hand under some of the best carders in N. E. Experience on nearly all kinds of stock. Temperate and a hustler. Age 30, single. Would take a good second hand job.

COTTON CARDERS.

1403 **Cotton Carder** with 17 years experience in N. E. mills as overseer and second-hand, now in the South but wants to return North. Has never worked for less than $3.00 but would take $2.50 to change. Married. Age 38. Best of references.

1469 **Cotton Carder and Spinner.** Has had charge of both in good mills. Excellent references. Age 37, married.

1535 **Second-Hand Carding, or** Speeder Fixer. Age 41; American. Is a first class man, and thoroughly acquainted with every detail of his work. At present employed, but can leave on very short notice. Prefers to obtain work in New England States.

1315 **Cotton Carder.** Over 20 years' experience as overseer in first class mills. At present employed. Well up on prints and light and heavy sheetings. Knows American and English cards, and speeders. Best references.

1238 **Second** hand of cotton carding. 37; married. Open for engagement.

1368 **Overseer on Second-Hand Cotton** Carding wants a position in small room at $2.50 per day or upwards. Will do his own grinding. Or, would take a first-class second hand job. Last five years in one place. Thoroughly practical and understands all the machinery in the card room. Age 37; married. Good reference. Prefers New England.

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1461 **Spinner, on Cotton or Wool.** Age 33; married; French. Has worked in one of the best thread works in this country, also in Alsace-Lorraine, on yarns from 70s to 160s. Is familiar with Dobson & Barlow machines and Schlumberger mules.

1493 **Boss Spinner.** Age 25; unmarried; German. Has worked on cassimeres, cheviots, stockinets, satinets and camel hair goods. Can operate American mules, and has worked for several years in American mills, to which he refers.

847 **Boss Woolen Spinner** with large experience and excellent references. Will start at $2.50 a day. Has spun yarns for fine dress goods, and yarns for low grade wool and cotton and shoddy mixes, and all cotton for hosiery. Perfectly reliable and temperate.

1543 **Woolen Spinner and Carder.** Has handled both departments together and separately. Will go South or West. Age 29; single.

1545 **Woolen Spinner.** A very reliable man, who has worked up to 2nd hand in a good N. E. mill, wishes to secure a position as overseer.

1519 **Overseer Spinning.** Age 31; American; married. Has worked on yarns from one run to 5¼. Will accept an average salary. At present employed, but wishes to better himself.

COTTON SPINNERS.

909 **Overseer Cotton Spinning,** spooling, warping, twisting, slashing and drawing-in. 16 years experience, mostly in this department. At present out of work because of change in organization. Can refer to leading N. E. mills. Will go South. Age 30; married.

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1176 **Cotton Spinner,** also overseer, twisting, spooling, warping. Has been overseer in three good mills. Experience covers most all kinds of machinery. At present employed, but could leave on short notice. Age 40, married. First class references.

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1429 **Cotton Ring Spinner** who has been overseer 5 years and second hand 8 years. Worked on white and colored yarns, spooled and twisted. Refers to past employers in Maine and Mass. Age 36. Married.

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1517 **Overseer Woolen Weaving.** Age 37; married. Has had a large experience on all classes of woolens and worsteds. Will go anywhere

1521 **Overseer Weaving,** on woolen or cotton goods. Age 42; American; married. Has worked on all classes of cotton, woolen, worsted and silk goods. Refers to past employers and others.

1506 **Worsted Weaver.** English; age 33; married. At present employed, but wishes to obtain a more lucrative position. Will go anywhere. Experienced on all classes of worsted goods, fancy dress goods, etc.

1482 **Weaver or Wool Sorter.** Has worked on cassimeres, cheviots, tricots, kerseys and cloakings. Good references.

1130 **Overseer of Woolen Weaving** wants position. Would accept 2nd hand's position in a good mill. American; protestant; age 36; single. Good man on Knowles fancy and plain looms, also Davis & Furber. Cassimeres, worsteds, meltons and flannels. Will not go South, West or Pennsylvania.

1547 **Boss Weaver,** with very long and varied experience. Familiar with all makes of machinery. Has been superintendent but would accept overseer job in a first class mill.

1551 **Boss Weaver,** especially up on plush looms, both wire and double. Has worked in almost every department of woolen mill and would take charge of a small plant at moderate salary. Age 42; married. New England experience.

COTTON WEAVERS.

1556 **Cotton Weaver.** Learned fixing in England and has been 16 years in Canada, 8 years overseer of weaving, beaming and warping. Wants to work in the U. S. will accept $3.00. Age 33; married.

1380 **Overseer Cotton Weaving.** Held overseer's position for 5 years in Mass. mill, but now out because of change in management. A man of well-known ability. Age 48; married, American. One of the best weavers in New England. Will go South to a good position.

1334 **Jacquard and Dobby Weaver** and designer on Knowles machines. 8 years' experience in this position. At present employed and can furnish excellent references. Age 38; married.

1533 **Overseer Weaving or Superintendent.** American; age 38; married. Has had twelve years experience on all grades of white and colored fancy goods. Would like overseers' position in large weaving room, or on carding.

1572 **Overseer of Cotton Weaving,** now employed in first class mill as second-hand, but would like to have charge of a room at $3 a day. Experience covers sheetings, sateens, drills, flannels, denims and stripes of all kinds. Lowell and Whitin looms. American; age 32, married. Excellent references from present and past employers.

1563 **Overseer Cotton Weaver** who has long experience as fixer, second hand and overseer on all kinds of cotton and silk looms. Splendid references from past employers. At present employed. Age 40; married.

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1544 **Underwear Knitter.** 18 years' experience on ribbed underwear. Has run silk, worsted, lisle, cotton and mixed yarn. Best references from present employer, with whom has worked four years. Can leave at once.

1549 **Knitting Machine Fixer.** 17 years' experience on almost all kinds of machinery. Now employed; wants to change; would expect $2.25. Age 38; married.

1492 **Boss Knitter,** Spring needles. Now holding a position in N. w York. A No. 1 on fleeces, both single, double, and cut pressers. Understands running and setting in all gauges from 12 to 32. Working at present on 26 and 30. Understands all makes of latch needles for underwear.

1554 **Boss Knitter.** Underwear, Jersey ribbed, lisle, wool, plaited work, silk. Can handle any latch machine. Good references. Age 26; married.

1435 **Boss Knitter** Underwear, astrakhans, stockinet, rubber linings, etc. Efficient workman on circular spring needle machine. Age 36. Married.

1401 **Boss Knitter** at present employed but wants to change. Experience on plush, cotton, and wool. 10 years as second hand previous to present position as overseer. Age 30. Married.

1568 **Underwear Knitter.** A young man with thorough training, and 7 year's experience as second-hand in N. Y. mill, wants position as boss knitter. Ribbed, fleece lined, cotton and woolen underwear. Campbell & Clute, Tompkins & Circular Rib Machine. American. References, first-class.

DYERS.

1531 **Boss Dyer.** American; Age 32; unmarried. Has had a large experience on raw stocks, rags, worsteds, yarns, pieces, cassimeres, kerseys and dress goods. Not at present employed. Can take position immediately.

1505 **Boss Dyer** on all classes of wool, woolen and worsted yarns, cotton warps, indigo, etc. Desires to change to better himself.

1476 **Boss Dyer.** Experience on kerseys, broadcloths, dress goods, cassimeres and worsted piece dyes. Has been in good mills for 3, 5 and 7 years and gave satisfaction. Would start in New England or Central States for $3.00 a day.

180 **Woolen Dyer.** Age 42; married. Has had a large experience, and is a good practical man. Used to all classes of goods. Has worked largely on government orders. Good indigo dyer. Refers to former employers and others.

1355 **Wool and worsted Dyer,** a young man with 5 years' training by one the best dyers at one of the largest mills in N. E. Experience on worsted and woolen cheviots, clays, worsteds, suitings, cloakings, beavers, dress goods, carriage cloths, yarn, slubbing, wool. Now boss dyer. Good reasons for desiring a change.

1559 **Boss Dyer,** raw stock, cotton, woolen and worsted yarns and piece dyes. A Scotchman with very thorough training. 18 years in this country. Now employed but will change for good job paying over $3.00. Age 32.

1561 **Boss Dyer,** with long experience on all kinds of worsted, serges, cloakings, flannels, repellants, kerseys, also all wool, cotton and silk. Best of references. Age 35; married.

DESIGNERS.

1383 **English Woolen Designer.** 20 years in leading Yorkshire and Huddersfield mills as designer, supt. and weaver. Very large experience and would accept moderate salary in good mill. Age 36; married, English.

1444 **Designer.** Has made a special study of designing during the past ten years. Wants a position which offers chance for advancement. Has worked on all classes of goods and is familiar with standard makes of machinery. Can fix, set up and has started sections of new fancy looms.

1474 **Designer of Woolens or Worsteds.** Has had textile school training, and about four years in good mills on novelty dress goods, cassimeres, blankets, coverts, etc. Very well recommended. Can accept position at once as designer or assistant superintendent.

1449 **Overseer of Weaving or Designer.** Age 38; married; American. Thoroughly capable. Has designed his own goods for eight years, and studied designing for two years. Left last position on account of sickness, and will take a small salary to start. Has worked on all classes of cottons, plain and fancy, and is acquainted with all makes of machinery. Refers to former employers and others.

1509 **Designer, or Boss Dresser,** or will take superintendency of small mill. Age 38; married. Has worked on dress goods, fancy worsteds, cloakings and piece dyes. At present employed as boss carder, but desires to better himself, if possible.

FINISHERS.

1526 **Foreman of Finishing Room,** Folding, Packing, etc. Age 45; married; English. Has worked on white and colored goods and prints. Is acquainted with every kind of machinery used in his business. Has worked 11 years in this country. Can give good references.

1534 **Overseer or Second-hand** Woolen Finishing. Age 26, unmarried. Has worked on fancy and piece dyes, broad-cloths, coverts, cassimeres, etc. At present employed, but wishes to better himself. Good references.

1494 **Finisher on Felts,** or will take a position for the making of sizing. Age 26; single. His last position was engineer and in charge of sizing and finishing all classes of felts. Good references.

1499 **Overseer of Finishing.** Age 43; American. Has worked on flannels, cheviots, cassimeres, fine suitings, broadcloth, hair lines, etc; from loom to case. Was 14 years with his last firm to whom he refers.

1489 **Boss Finisher, Second-Hand** or Boss Shearer. Well experienced; excellent references. English; age 27; single.

1396 **Wool Finisher.** This man has had a very large experience among well-known mills and refers to past employers. Character and ability of the first order.

1351 **Woolen and Worsted Finisher** with 7 years' experience as overseer in R. I. and N. Y. mills, from which he has excellent references. At present second hand in one of the best worsted mills in N. E. Habits first-class; age 29, married.

MISCELLANEOUS.

1571 **Woolen Salesman,** who has filled successfully all positions in woolen jobbing house, desires a position with manufacturer or dealer in textile goods. Fine business qualifications and A 1 references.

1566 **Overseer Cotton, Slashing,** Beaming, Warping and Dressing. Now employed as overseer in good mill, but would change for better job in a N. E. mill. First-class references. Married. Age 43. American.

1488 **Boss Carpenter or Master Mechanic.** Age 46; American. Is acquainted with all makes of cotton machinery, and is a good man on shafting, wood work, etc. At present employed, but wishes to better himself.

1557 **Bleacher,** overseer or second hand. Well recommended, good training, reliable. Wants $2.50. Age 27; married.

1558 **Supt. of Bleaching,** dyeing and finishing, of all classes of cotton piece goods, plain and figured, desires a position. Has had over 20 years' experience in managing help, and has a thorough knowledge of the business in all its branches. Can furnish excellent references from present and past employers.

1555 **Silk Superintendent.** Experience in all departments of a large and successful mill; serges, sateens, linings. Young man but well qualified to take charge or act as assistant superintendent. Knowledge of office work and prices as well as machinery.

1552 **Overseer Beaming & Slashing,** at present employed but would like to change for good boss job. First class experience and good references, age 32.

1560 **Overseer Twisting and Reeling** who has worked 20 years in the same mill, 10 years as overseer, has resigned on account of new supt. Refers to proprietors and former supt. Age 38; married. Experience on threads and twines.

1538 **Master Mechanic.** Age 41; married; American. Is acquainted with all makes of looms, cards, pickers, frames, etc. At present employed, but wishes to better himself. Refers to present and former employers.

1530 **Boss Dresser.** Age 28; married; English. Has worked on dress goods, fancy worsteds, suitings, cassimeres, etc. Is at present employed, but wishes to obtain a steadier position. Good References.

1518 **Overseer Weaving** Has worked on colored cotton goods, shirtings, dress goods, duck, heavy sheetings, etc. Age 46; married; American. At present employed. Wishes to better himself. Can leave on two weeks' notice.

1528 **Overseer Dressing Room** Age 38; married; Scotch. Has worked on all classes of goods, from coarse druggets to the finest grade of fancy worsteds. Is acquainted with all forms of looms used in dressing. At present employed, but wishes to change his position. Will go anywhere.

1515 **Pay-Master and Shipping** Clerk. Will only work in Southern States. Will accept a moderate salary to begin.

1514 **Overseer Twisting, Spooling,** Winding and Reeling. Age 30; married; American. Has been in one position for 17 years. Wishes to better himself. Will go anywhere.

1520 **Overseer on Prints, Sheetings** and Shirtings. Age 32; married. Wishes to obtain a position in the New England States.

Eastern Yarn Market.

(Continued from page 153.)

and manufacturers of flat goods are buying the carded silk and are mixing with wool. Thread waste is high and importers will not offer new lots on account of the high prices this stock is held for in Europe. It will undoubtedly be a fact that when wool reaches a normal basis much thread waste and noils will be imported. At present, nothing is being imported. We are flooding our mills with orders and are depending wholly on the domestic clip for our supplies. We note that the American Woolen Trust has opened a purchasing office for noils, shoddies and wastes, and it looks as though this trust intended to use all its by-products in its various mills. Be this so or not, noils are very scarce on today's market and the price for them is advancing materially. The fine mills in the Mohawk Valley, Cohoes and Bennington are all busy, and many re-orders are being received. These mills are all more or less out of wool and are on the market again. It must be remembered that wool can be exported at 16 cents. Hargreaves & Leister have been in this market again from England and have taken up considerable wool. The position of the wool market is one that concerns spinners to a great degree. The Western farmers, notwithstanding the fact that last year they got left later in the season, are running prices up considerably more this year. They are refusing 16 and 17 cents, which will bring territory wool beyond 50 to 52 cents in Boston.

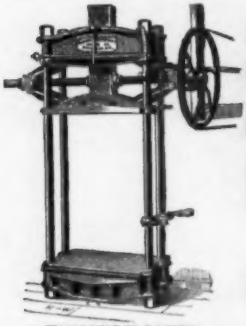
The trouble with the underwear manufacturers of all fine wool garments has been that the buyers and jobbers bought large stocks in Germany just before the present tariff, and are only now getting out of fine underwear. This will speedily right itself as the present season advances. Spinners are beginning to hear from sample orders made the early part of the year, but are unable to take care of their customers, because the stock from which the goods were made has either been used and sold, or is much higher in price. Spinners have not repeated their experience of trying to protect customers as they did two years ago, and lost money by it. We hear that fine noils are being bought up, carbonized, and shipped to Europe at a good profit. The spinners of yarn for underwear and hosiery mills will find wool wastes of all kinds a very scarce article and will interfere with the profit making of many mills. The only waste available is carded silk, which is being introduced and will be used in large quantities. Mills using 2-ply yarns are busy, and we confidently believe before the year is over that we will come nearer a boom than this country has been for years.

—French cotton spinners and weavers continue their agitation to prevent the Government making any concession to England regarding the duties on cotton manufactures in Madagascar.

—The Japanese manufacturers are very conservative in their business methods, and manufacture large quantities of goods only on orders. The largest silk factory in Japan using power-looms is the Kyoto Orimono Kaisha, of Kyoto. It imported these machines from France. It was the intention of the company to manufacture silk fabrics for export but after some years of unsuccessful attempt, the project was abandoned, and the company commenced making satins and "obi" materials for home use.

—Wages are undeniably less in Switzerland than elsewhere, but at the same time living is cheaper. The necessaries of life are taxed less on importation; hence the workman is able to enjoy a degree of comfort equal, if not superior, to that of the same class in other countries.

—The year 1898 was a disastrous one for the woolen trade of the Roubaix-Tourcoing district. Dyers, finishers, combers, spinners all lost money.



KNUCKLE JOINT.

BOOMER & BOSCHERT

BALING PRESSES

ARE THE STANDARD.

Boomer & Boschert Press Co.

338 West Water St., SYRACUSE, N. Y.

HYDRAULIC.

EASTON AND BURNHAM MACHINE CO.,

Pawtucket, R.I.

ALL KINDS OF Spindles USED IN THE MANUFACTURE OF COTTON, WOOL & SILK

IMPROVED UPRIGHT SPOOLERS

TO SPOOL FROM COP, SKEIN, OR BOBBIN.

TRADE MARK.

Chas. B. Cook, *Pres.* Arthur H. Mason, *Treas*

Capital Stock, $500,000.

SANFORD SPINNING CO.

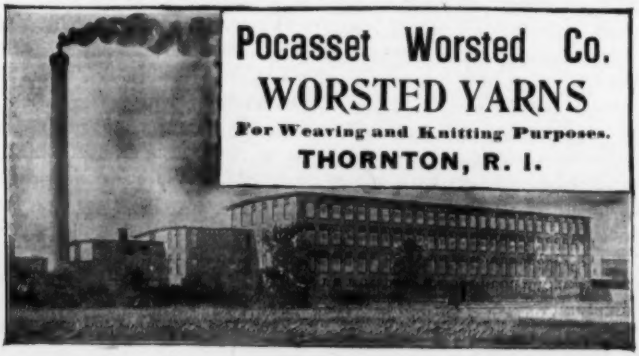
Fall River, Mass.

32,000 Spindles. Weekly product, 65,000 pounds 6s to 30s.

Colored Cotton Yarn

From American Peelers and Egyptian Cottons.

Solids, Mixtures, Bleached, Combed and Carded Egyptians Cops and Cones.



Pocasset Worsted Co.

WORSTED YARNS

For Weaving and Knitting Purposes.

THORNTON, R. I.

YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn: Spinners are all well employed on heavy yarn, as there has been a good demand for these yarns, both on account of the ribbed underwear mills, but also for flat goods mills, which heretofore have used wool, but are now running on fleeced lined garments, both face and back. This has resulted in the spinners getting good orders. We must not lose sight of the fact that when the underwear mills are running under nominal conditions, using their regular quota of wool, there is more cotton spinning than knitting capacity. The southern mills are cutting considerably into the Eastern mills' business, and this will be more pronounced as knitters will not buy of a combination mill when they can possibly secure yarn elsewhere, and the Southern mills, with improved machinery, can beat the Eastern in price and oftentimes in quality. While this holds good so far as the white carded yarn is concerned, on colored cotton yarn and on combed cotton yarn the combination have the situation well in hand, as the finer mills and the coarse combers are all combined, and can make prices without fear of competition. The prices have not advanced materially as yet on combed yarn, but another season will see a marked advance. The price of manufacturing thread has advanced 100 per cent., and other yarns may be expected to follow. The balbriggan mills are very busy, as are the knitters of ladies' lisle thread vests. Spinners are very busy and have a good prospect for future orders which are now being placed.

Worsted Yarn: Spinners have many orders, but are not what may be called busy. Prices have advanced in some instances from 7 to 10 cents per pound, and have, to an extent, checked purchases. There is no special inducement for spinners to push for orders on the present basis of wool, as an upward tendency has set in, and there is no knowing where it will end. Spinners abandoned many orders which have been pending; so sudden was the advance that many had not made wool purchases covering their contemplated orders, and therefore had the alternation of either making new figures or staying out of the market. Many spinners will not quote figures until after July 1st. It looks as though the worsted yarn trust would not go through. The options on the mills expired June 20, and from those who are on the inside it is extremely doubtful if it will be a success. It is said that $11,000,000 of the preferred stock was subscribed to, but entirely in Philadelphia. Many of the best spinners have refused to go in because those managing the trust wanted to pay part stock and part money. Some of the best spinners in the trust have enormous sums offered for their plants. The other trust, which is working smoothly at this time, is really a gigantic affair. It has 4500 looms, 290 combs, 410 sets of cards, and has a total output of $40,000,000. It is evident that this trust will consume all its by-products, and consequently noils will be a scarce article. We hear from good authority that there is a project on foot for a number of weaving mills clubbing together and building a large spinning mill, thus getting their yarns at the lowest possible cost. This project was advanced under the old McKinley law, and has now been revived with

(Continued on page 151.)

Frank E. Patterson, Prest. Oscar W. Wood, Treas

GERMANTOWN SPINNING COMPANY
INCORPORATED
GERMANTOWN
JAN. 9TH.
1890

Germantown Spinning Co.

COTTON CARDED

HOSIERY YARNS

In numbers from 6s to 26s.

Germantown, Philadelphia.

W. Warren Thread Works,

SPOOL COTTON
on 100 to 12,000 yd. Spools or Tubes.

A Specialty of Thread for Manufacturers Use
on Spools, Tubes or Bobbins.

Also Seaming and Hosiery Yarns
on Cones, Tubes or Skein.

Our bleaching and dyeing facilities are new and unsurpassed for prompt and neat work. Correspondence solicited.

WESTFIELD, MASS.

The Best is the Cheapest.

It is BETTER and CHEAPER to wind yarn by the "Universal" system before shipment from the mill, thus insuring perfect delivery to knitting machines without rewinding.

UNIVERSAL WINDING CO.,

F. H. BISHOP, Manager.

226 Devonshire St., - Boston, Mass.

(Continued from page 149.)

a good chance of success. Commission houses believe that the trust will get all the piece dye business, but say they are not afraid of them on fancy worsted. The weavers are very busy on medium worsted cloth, and many of the mills are running night and day. On the other hand, the piece cloth mills are not running full time. We hear that many of the Rockville mills are only running four or five days per week. Within the last two or three days, from June 16 to 20, there has been a regular boom for men's wear worsted cloth, lightweights. The mills have been sold up as fast as they have opened samples. The dealers and clothiers are all out of stock. Europe cannot make cloth for us at prices prevailing, and clothiers are beginning to understand that this is the best market in the world. It is undoubtedly a fact that spinners before the year is over will have more work than they can well attend to, with prices much higher. Top makers are busy and are getting higher prices for tops. The orders taken for yarn early in the season will help the weaver. After these orders are filled buyers will be forced to pay more money for cloth.

Spinners of French spun yarn are busy on orders for hosiery manufacturers and underwear knitters. The mills are well supplied with orders taken early in the season and therefore at unsatisfactory prices. Weavers are placing orders only with spinners outside trusts and combinations.

Cheviot yarns are not selling well. The call is coming wholly for fine yarns, as the trend of all cloth today is toward finer grades, and the great advance is on this class of yarn.

Woolen Yarn: Spinners are busy on all classes of work and will continue so for some time to come. The hosiery and underwear mills are all on heavy work, and are running quantities of fine wool yarn. Mills which have owned anti-tariff wool are about cleaned out, and are again on the

(Continued on page 153.)

CATLIN & CO.,
YARNS.
67 Chauncy St., Boston
216 Church St., New York.
206 Chestnut St., Philadelphia.

Walcott & Campbell Spinning Co,
IROQUOIS MILLS.
FANCY HOSIERY YARNS
IN ALL COLORS.
New York Mills, Oneida Co., N. Y.

JAMES E. MITCHELL & CO.,
Commission Merchants.
122 & 124 Chestnut St., Philadelphia, Pa.
74-78 Summer St., Boston.
Cotton, Woolen & Worsted Yarns.
All numbers on Hand and Made to Order.

COTTON WARPS
White or Colored.
Toweling and Grain Bags.
Dana Warp Mill,
WESTBROOK, MAINE.

TUCKER & COOK MFG. CO
MANUFACTURERS OF
WHITE AND COLORED COTTON **WARPS**
Nos. 6s to 30s,
On Beams, Jack Spools or in Chain
CONWAY, MASS.

GRANT YARN CO.,
COMBED AND CARDED COTTON
YARNS 40s and above.
AND
FITCHBURG, MASS. **WARPS**

E. JENCKES MFG. CO.
Colored Cotton, Hosiery, Woolen and Merino **YARNS**
PAWTUCKET, R. I.

LINEN YARN IMPORTER.
Hughes Fawcett, 115 Franklin St., New York,
Flax, Hemp & Jute Line and Tow Yarns,
FOR WEAVING PURPOSES
Linen Jacquard Harness Twines.
Fine Cotton Harness and Heddle Twines.
For Cotton, Silk, Woolen and Carpet manufacturers. Correspondence solicited. Samples promptly furnished.

CAPACITY, 50,000 Spindles.

ORSWELL MILLS

FITCHBURG MASS.

COMBED OR CARDED

COTTON YARNS

In Chains and Skeins, on Balls, Beams, Spools—single or twisted.

...CORRESPOND WITH THE...

American Moistening Company, Boston, Mass.,

And learn what their system of air moistening has accomplished. The

"DROSOPHORE" AND "VORTEX" HUMIDIFIERS

Have been most advantageously adopted by the representative mills of this country. Our system will increase your production and overcome troublesome electricity, making your carding run much better. It will reduce your waste account, and generally prove a profitable investment. With our system a perfect **Spinning** or **Weaving** a mosphere in any climate or weather is assured, and any degree of humidity is obtainable. Will cool the air in warm weather, and warm it in cold weather. **Purifies the air and makes it healthier for the work people.** Write for Booklet on Humidification.

AMERICAN MOISTENING COMPANY, 150 Devonshire Street, Boston, Mass.

PLAIN AND FANCY PATTERN

Cotton Warps,

WHITE, MIXED AND COLORED.

For SATINETS, BLANKETS, ETC.

WHITTIER COTTON MILLS,

LOWELL, MASS.

INDIAN ORCHARD COMPANY,

Indian Orchard, Mass.

Manufacturers of - - - -

COTTON WARPS AND YARNS

In gray and all colors, single or in any twist.

COLORED COTTON

Machined, Carded or in Roving.

NOVELTY YARNS

In Cotton, Mercerized Cotton, Silk and Worsted, in various Patterns, Colors and Twists.

We are always pleased to assist our patrons of the Woolen Goods manufacture in special pattern warps for samples.

We use a uniform grade of long stapled cotton in all our manufacture.

(Continued from page 151)

market. The wool dealers are holding prices firmly. Statistically, wool should be selling at these prices now. Dealers are getting these advance prices and manufacturers refuse to pay an advance one day, and the next pay the advance plus a further advance. Dealers sell at a price only to find their men in the country paying more than what they are selling at. Buyers are beginning to realize what has happened within the last four or five weeks, and there can be no doubt that if we need wool much or little we will have to pay for it until the markets are equalized. When the advance began, manufacturers thought that supply had nothing to do with prices. The buyers of all kinds of woolen goods are beginning to realize this from what foreigners are offering fabrics of all kinds, at many cents above previous prices. The sharp and radical advance on wool is to come in November and December. We are not importing foreign wool of any amount and we think it safe to estimate that there is not over 3000 bales in bond today. This is a fine season on all kinds of woolen fabrics and all the manufacturers who have been carrying wool are now on the market.

The condition of the woolen spinners is proof positive of other conditions. We know of manufacturers who have previously had enough spinning machinery now having spinning done outside. The hosiery manufacturers are all busy and are securing good orders for goods, mostly for merino yarn, wool and Peruvian cotton. Orders will be late this year on all classes of underwear, but for all that the orders will be placed in large amounts later. There is a growing demand for black natural wool tops. This article is producing results that enable manufacturers of first class underwear to secure many orders. We note that carded and combed silks are being used extensively by the manufacturers of fleece lined underwear,

(Continued on page 147.)

WOOLEN AND MERINO YARNS. Special line for Bicycle and Golf Goods in all shades For Hosiery, Gloves, Underwear, and all kinds Knit Goods. Cop, Cone and Skeins.

The J. & H. Clasgens Co.
New Richmond, O.

WE BUY FOR CASH!
ODD LOTS OF
YARNS AND WARPS
ENOS CROSLAND'S SONS,
Haverford Ave. and 69th St., PHILA., PA.

A. HERBST. J. W. JONES
HERBST & JONES,
KENNEBEC WORSTED MILLS.
Successors to Kershaw Worsted Co.
WORSTED YARN SPINNERS,
21st & Naudain Streets,
PHILADELPHIA.

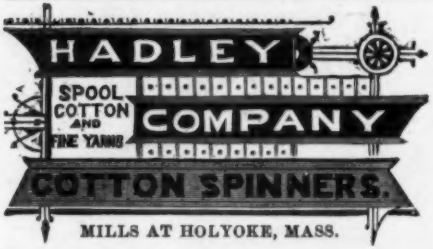
ALBERT R. ELSASSER,
Clifton Worsted Mills,
WORSTED YARNS.
Lustre Worsted a Specialty.
Mills: Addingham, Del. Co., Pa.

C. MOORE & CO.,
MANUFACTURERS OF
TWINES, THREADS AND YARNS.
Jacquard Harness Twines of all kinds on hand and made to order.
S.W. COR. FIFTH & MARKET STS.,
Philadelphia.

EICHMANN & STERNBERG
530 Broadway cor. Spring St., NEW YORK.
Plain and Gassed Cotton Yarns,
HOSIERY COTTON YARNS,
Mercerized Cotton Yarns. Harness Twines.

Cohannet Mills,
TAUNTON, MASS.
Spinners of High Grade
HOSIERY YARNS OF EVERY DESCRIPTION.
Selling Agents JAMES E. MITCHELL & Co., Philadelphia and Boston.

DANIEL S. PRATT,
180 Summer Street, - BOSTON,
ROOM 24.
851 Calle Piedad, Buenos Aires.
SOUTH AMERICAN WOOLS,
..Personally Selected..
Graded to the Standard of U. S. Markets



SPINNERS OF

FINE COTTON YARNS

30s TO 100s.

Gray, Bleached, or Colored. On cop, in skein on spools, cones or tubes.

Fine Cotton Warps, single and two-ply, in chain, etc.

Spool Cotton and Seaming Thread.

95 Milk St., BOSTON.

THE WILLIAM CLARK COMPANY,

WESTERLY, R. I.

Mills equipped with the latest and most improved machinery.

Combed Egyptian from No. 20s to 100s. Combed Sea Island from No. 40s to 200s.

Also 2, 3, 4, 5 ply and 6, 9 and 12 ply cable laid.

Hosiery Yarns on Cops Tubes or in Skeins, Grey, Bleached or Dyed. (Fast Colors.

MONUMENT MILLS,

Manufacturers of

White, Colored, Fancy and Double and Twist,

COTTON WARPS

HOUSATONIC, MASS. 4s to 60s.

GREENE & DANIELS MFG. CO.,

COMBED, CARDED AND GASSED

Yarns, Threads, Twines and Chain Warps,

Colored and Bleached Yarns Furnished in any manner desired by the trade. PAWTUCKET, R.I.

Established 1849.

CARRIAGE CLOTHS.

LIVERY CLOTHS.

ACCOUNTS SOLICITED.
Broad Cloths, Sackings,
Cotton Warps, Whip Cords.

C. Coles Dusenbury & Son,
396 & 398 Broadway, N. Y. City.

HAYES, O. H. & CO.

Representative Lines of Woolens

O. H. HAYES & CO.

Liberal arrangements made with manufacturers or men controlling mills' productions.

Philadelphia Yarn Market.

The trade in cotton yarn the past month has been generally good, but prices have not advanced, and in some instances have been rather weaker. Stocks are well sold up, but there is a tendency to over-produce in the cotton market. New spinners starting—especially in the South—are pushing to make sales.

Prices have been hurt to some extent, although Southern spinners, having looms, are now weaving their yarns, and are not trying to push the yarn market; the advance in cloth justifies this.

Worsted spinners are still well sold up.

Woolen spinners are dull, and their trade is generally unsatisfactory. We quote:—

Warps:—

20/1	12 to 12½
22/1	12½ to 12⅝
26/1	12¾ to 13
12/2	12
14/2	12 to 12¼
16/2	12⅛ to 12⅜
20/2	12¾ to 13
30/2	15
40/2	21 to 22

Skein:—

20/1	12 to 12⅛
19s	12 to 12⅛
26s	12 to 12⅛
4s to 10s	10 to 11
14s soft	11½
16s "	11⅝ to 12
12/2	11 to 11¼
14/2	11¼ to 11⅜
20/2	12⅛
30/2	14⅛
40/2	20 to 22
8/3 hard	10 to 10¼
16/3 slack	11⅛ to 12
16/4 slack	11⅛ to 12
16/2 slack	11⅛ to 12
12/3	11⅛

Southern Cones (various qualities).

6s to 8s	10½ to 11
10s	11⅛ to 12½
12s	12 to 13
14s	12½ to 13½
16s	12½ to 13½
20s	14 to 14½
22s	14 to 14½
24s	14½ to 15½
26s	15 to 16
30s	16 to 16½

Shuttle Cops:—

6s to 8s	11½
12s	12
16s	12 to 12½
26s	12½ to 13
40s	15½ to 16½

Mixed Colored Cones:—

6s to 8s	12½ to 13
10s	13
12s	13½ to 14
14s	14 to 14½
16s	15

Eastern Cops:—

10s hosiery	12½ to 13

FRENCH AND BRADFORD SYSTEMS

B. F. BOYER & CO.,

WORSTED YARNS

IN WHITE AND MIXES.

Woolen and Merino Yarns

OFFICE AND MILL
Delaware and Cooper Sts.
Camden. N. J.

Eddy & Street,

COTTON, **YARNS** WORSTED,
AND
WOOLEN, **BRAIDS** SPUN SILK.

PROVIDENCE, R. I.

WAVERLY WORSTED CO.

SPINNERS OF

WORSTED YARNS

FOR WEAVING AND KNITTING.

Main St. & Green Lane, Manayunk. Philadelphia.

RICHARD CAMPION,

Selling Agent for—

Bristol Worsted Mills,
Highland Worsted Mills.

17 Bank Street, Philadelphia, Pa.

HOWLAND CROFT, SONS & CO.

LINDEN WORSTED MILLS.

Fine Worsted Yarns

OFFICE AND MILLS:

Broadway and Jefferson Ave., Camden, N. J.

Represented by FIRTH BROADHEAD,
937 Banigan Building, Providence, R. I.

ALLEGHENY WORSTED MILLS,

Thomas Wolstenholme, Sons & Co., SPINNERS OF

ALL NUMBERS SINGLE AND TWO-PLY,

Worsted YARNS,

Sell Direct,

In Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural & Fancy Mixes

Office and Mills: Frankford Ave. and Westmoreland St., Phila., Pa.

CRANSTON WORSTED MILLS.

Worsted and Mohair Yarns—white or colors, in skeins, on spools, cones, or shuttle bobbins.

NOVELTY YARNS—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making Yarns **only.**

CENAPPED YARNS of all kinds. Doup Yarns. Harness Yarns. For Braids, etc.

BRISTOL, R. I.

George Campbell & Co.

Worsted Spinners.

Yarns, both French System and Bradford.

Knitting Yarns in all Grades and Mixes.
All Numbers to 60s.

21ST STREET AND WASHINGTON AVENUE, PHILADELPHIA.

MALCOLM MILLS CO.,

MANUFACTURERS OF

Novelty Yarns, Silk Noil Yarns, in Fast Colors AND White.

Mills, Frankford, Pa. Office, 229 CHESTNUT ST., PHILA.

(Continued from page 155.)

14s	13½ to 14
16s	14 to 14½
20s	15 to 15½
10s shuttle	12½ to 13
14s	13 to 13½

Eastern skein ½c. above cops.

Eastern cones ½c. to 1½c. above cops.

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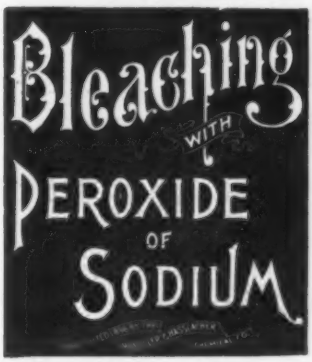

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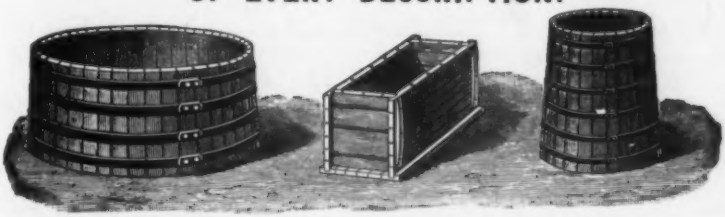

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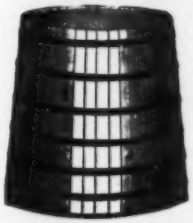

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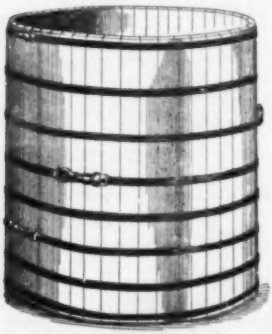

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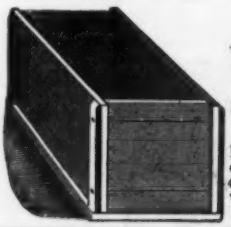

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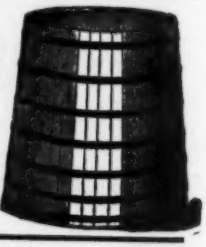

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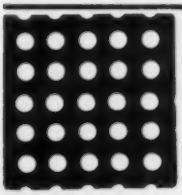

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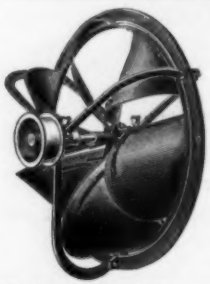

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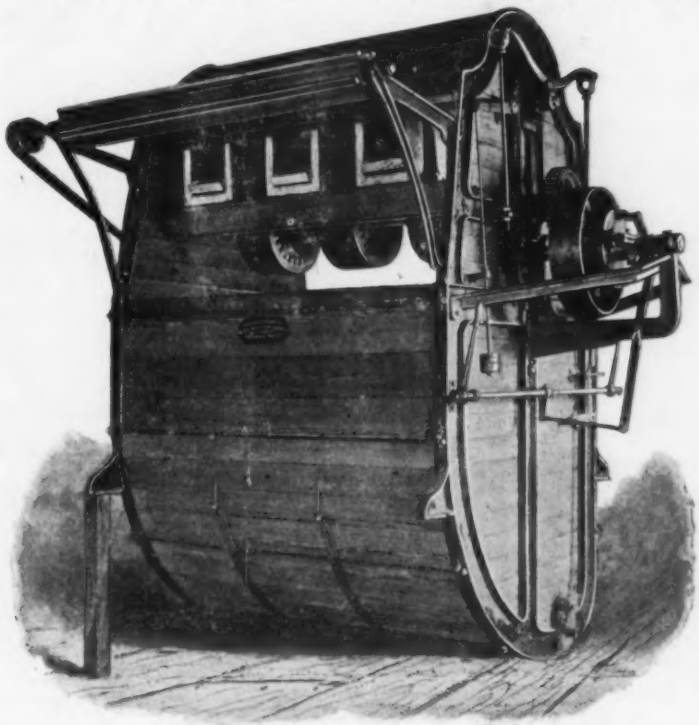

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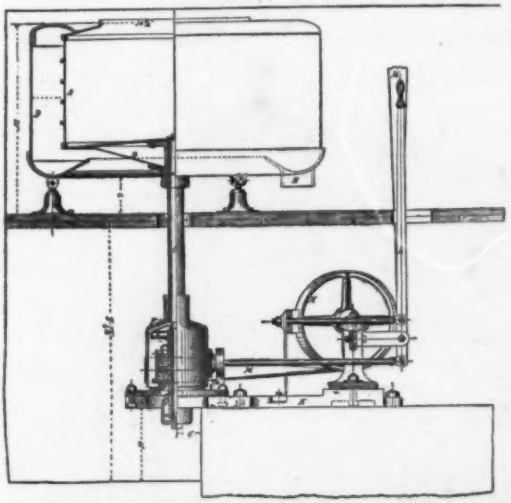

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With or without List Saver.
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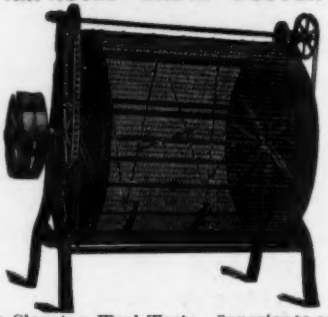

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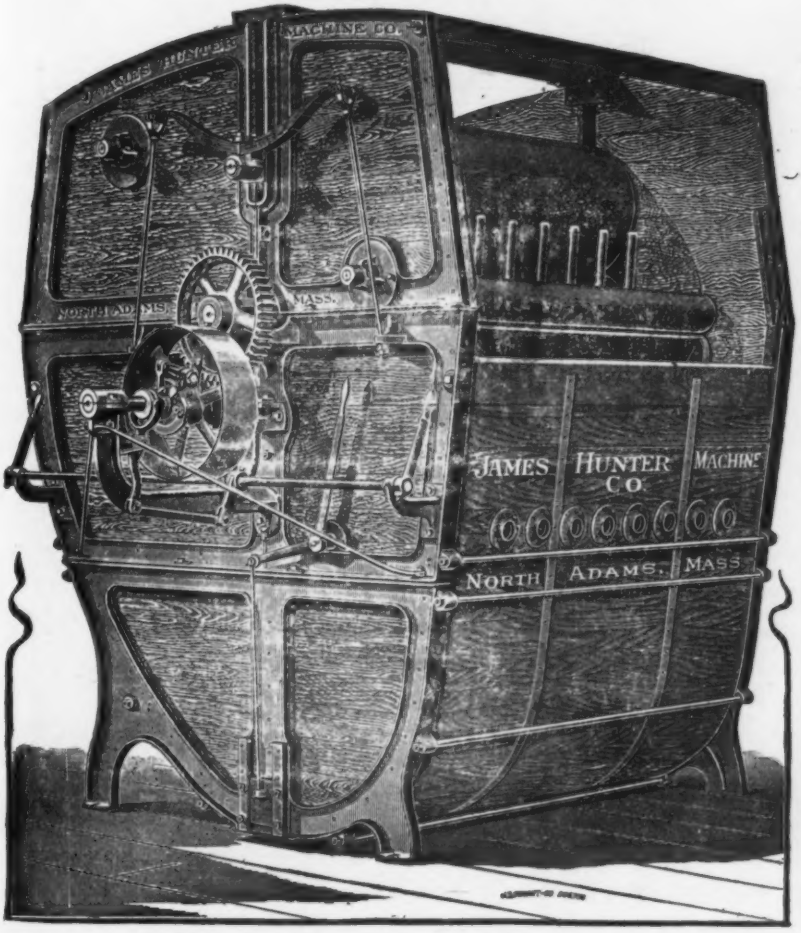

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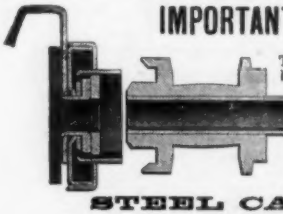

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MANUFACTURERS
Fine Wool Shoddies and Extracts,
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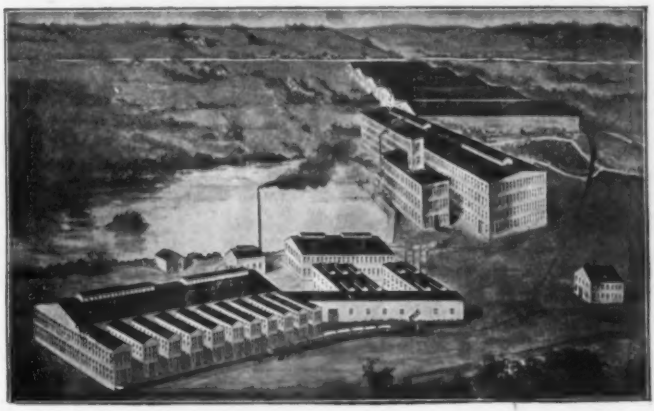
The New Morse System For Cleansing Wool.

THE practical success of this system of cleaning wool has now been demonstrated beyond question; and the extensive works at Norton, Mass., are now prepared to handle large quantities of wool for manufacturers and the trade.



Morse Wool Treating Works at Norton, Mass.

Some of the advantages to be derived from this process are as follows:

We leave the wool in much softer and better condition than the old method of scouring, never harshing.
We save a larger percentage of the wool by preserving all the fibres.
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We save all of the nerve of the wool, which is of great advantage in carding, drawing and spinning, and of great benefit in finishing.
We have shown a saving of 3% in noiling and 5% through works.
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We have demonstrated all of the above facts.

We can do the work at a saving to the manufacturer, adding nothing to the cost.

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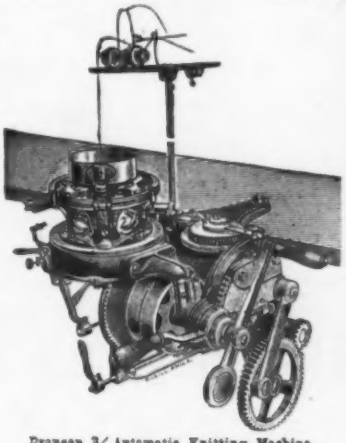

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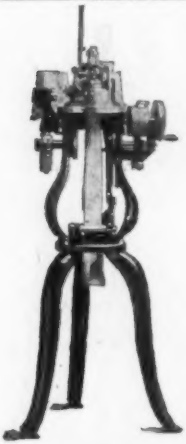

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All kinds of

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For Men's Underwear, Ladies' and Misses' Hose Legs & Leggigs.

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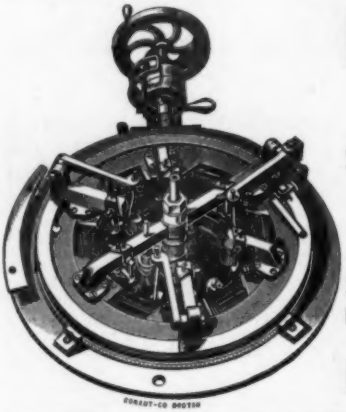

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of LATEST CONSTRUCTION

giving GREATEST PRODUCTION,

and with points of merit not to be found in any other style of machine for

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LEGGINS,
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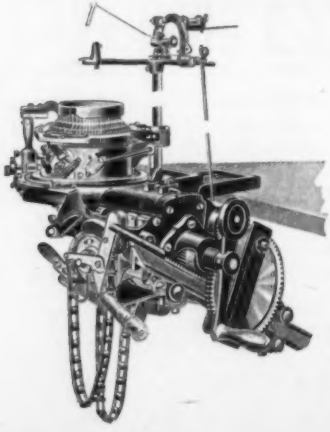

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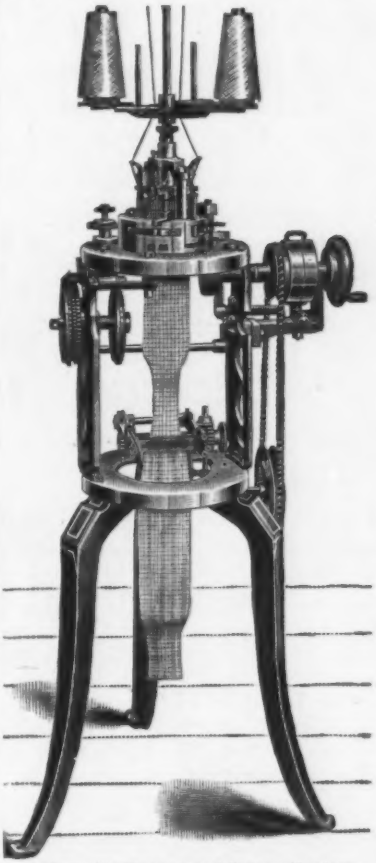

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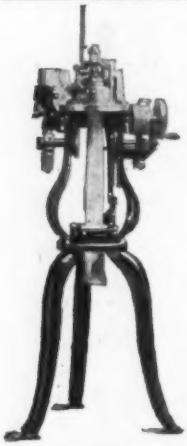

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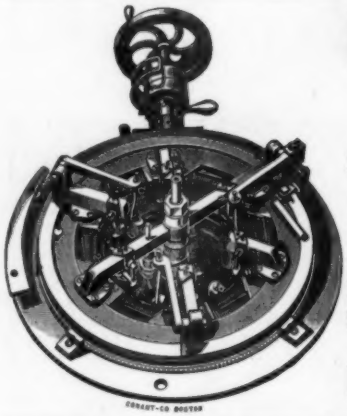

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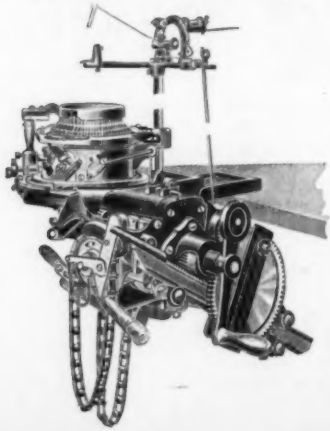

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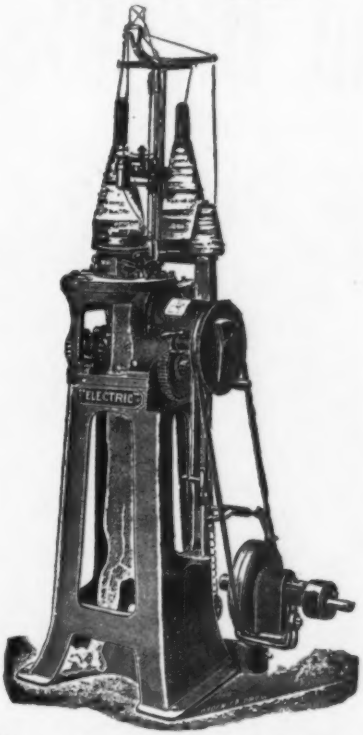

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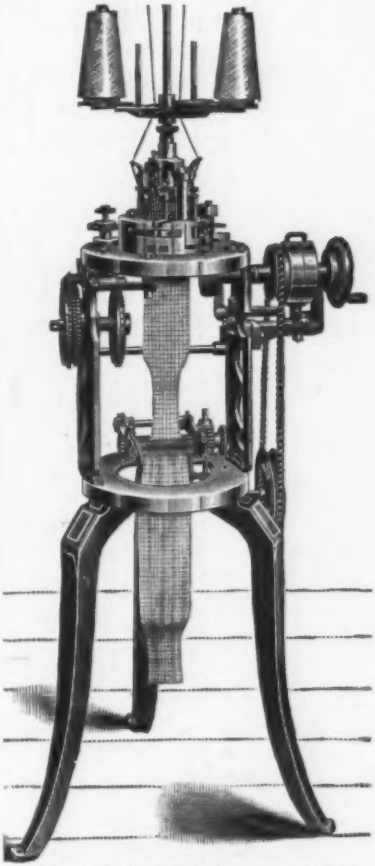

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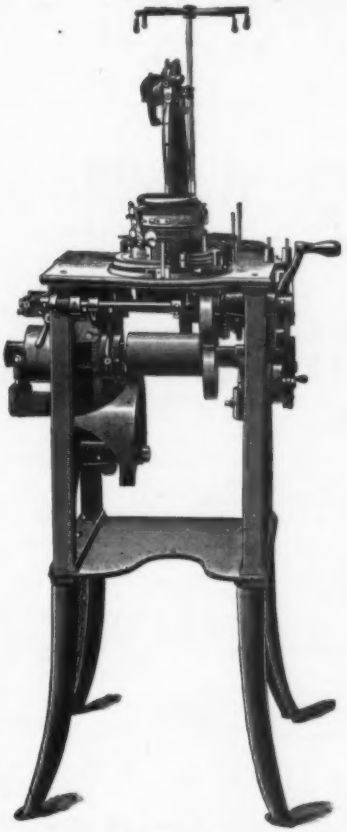

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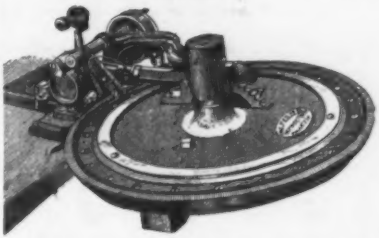

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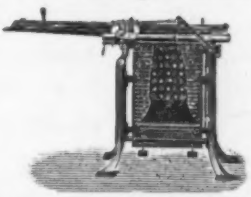

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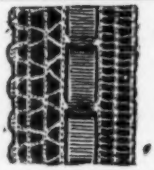

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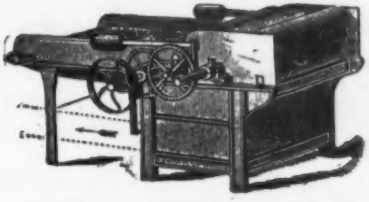

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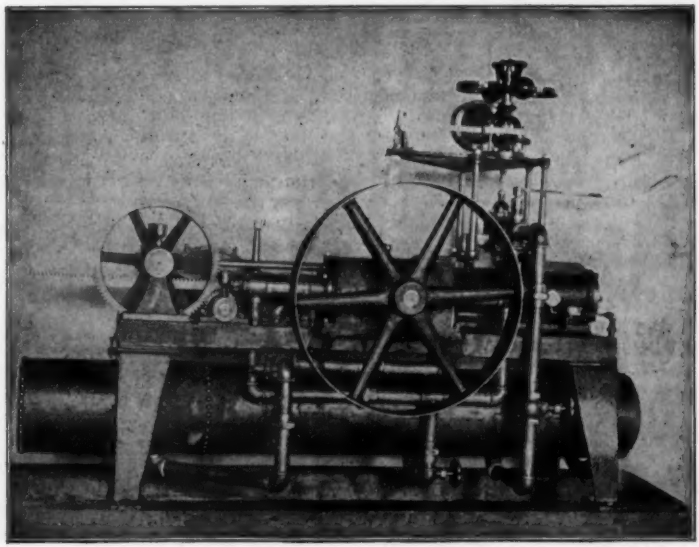

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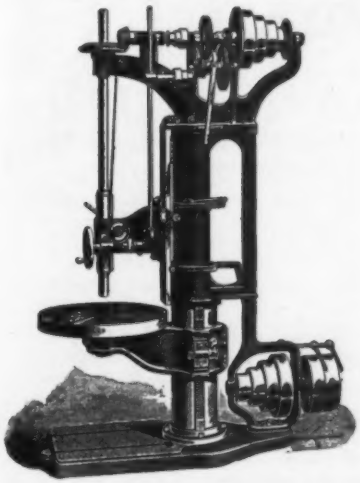

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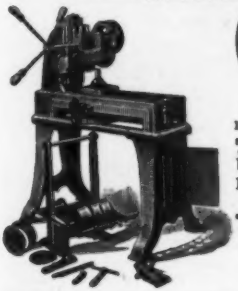

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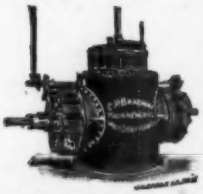

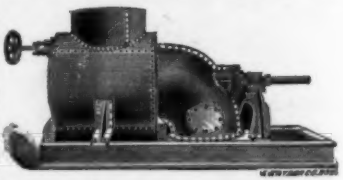

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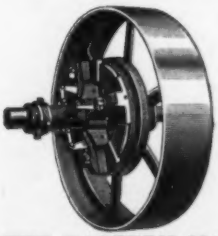

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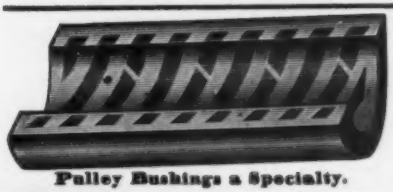

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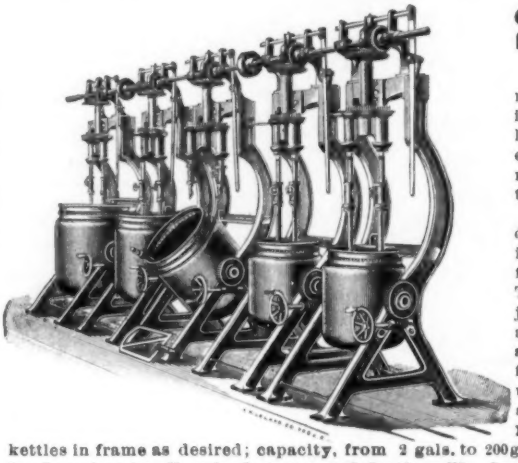

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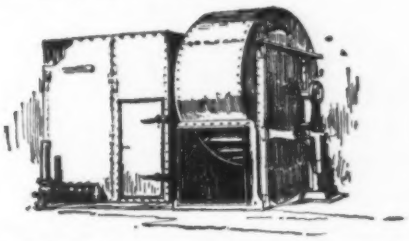

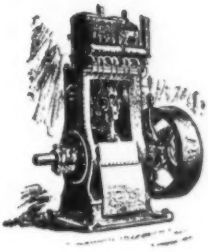

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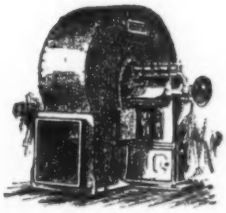

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